DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

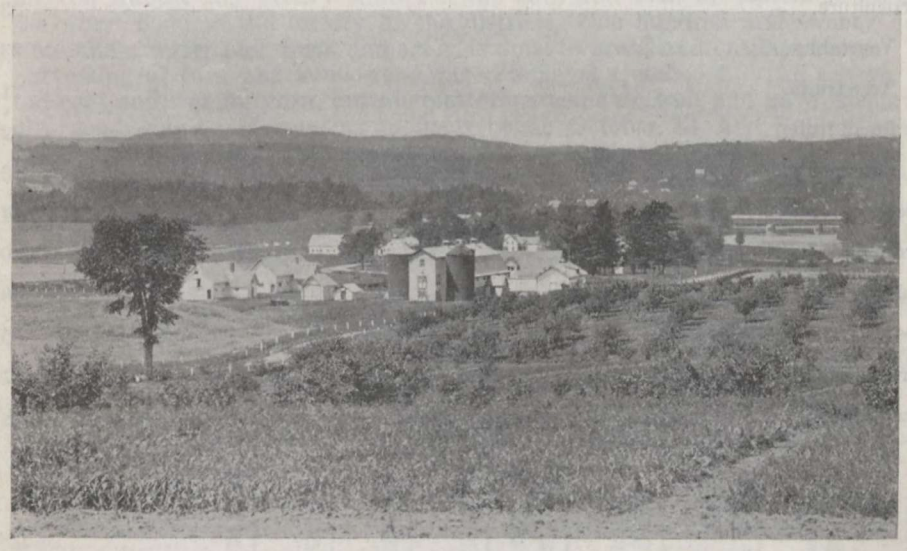
EXPERIMENTAL STATION

LENNOXVILLE, QUE.

REPORT OF THE SUPERINTENDENT

J. A. McCLARY

FOR THE YEAR 1924



Orchard and farm buildings, Dominion Experimental Station, Lennoxville, Que.

Printed by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1925

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DOMINION EXPERIMENTAL STATION, LENNOXVILLE, QUEBEC

REPORT OF THE SUPERINTENDENT, J. A. McCLARY

THE SEASON

The month of January, 1924, was cloudy and mild with a mean temperature of 15·17°, the highest for January since 1919. The weather during February was fine and cold without much snow, and wagons were in use March 6. The ice cleared out of the St. Francis river, which runs through the farm, on April 8. Ploughing was commenced April 24, and seeding April 29. Cold west winds prevailed in May. Seeding was finished May 20, and corn planting commenced May 21. Only 1·55 inch of rain fell in June compared with a ten-year average, for the same month, of 4·14 inches. Haying was started July 4, and finished July 30. The 5·13 inches of rain in July greatly benefited the crops. August was dull and showery; grain ripened late, and harvesting was commenced August 26. Heavy rains fell the 10th and 11th of September causing the worst flood in the history of the district. One hundred and twenty acres were under water and much damage was done to grain and ensilage crops. The harvesting of corn and sunflowers was completed October 4. The season was too cold and wet for corn, but all root crops came on well and gave exceptionally good yields. Harvesting mangels began October 13, and pulling swedes finished October 28. Fall ploughing was completed November 13. The St. Francis river froze over November 17, and the first sleighing was on November 30.

METEOROLOGICAL RECORDS AT LENNOXVILLE, QUE., 1924

Month	Temperature ° F.					Precipitation			Total sunshine
	Highest	Date	Lowest	Date	Mean	Rainfall	Snowfall	Total precipitation	
						Inches	Inches	Inches	Hours
January	45	11	−28	28	15·17	2·15	27·50	4·90	79·5
February	40	27	−29	9	5·77	.....	15·50	1·55	126·0
March	51	23	− 3	2	29·45	4·95	10·00	5·95	102·0
April	69	29	7	1-3	39·06	2·60	10·00	3·60	147·3
May	75	18	19	18	48·45	2·30	.....	2·30	185·1
June	80	27-28	31	1-2	58·79	1·89	.....	1·89	245·3
July	88	7	44	15	66·11	5·13	.....	5·13	243·9
August	87	6	39	2	63·99	4·72	.....	4·72	202·9
September	79	1	26	25-26	54·23	6·54	.....	6·54	156·8
October	75	3-4-5	20	31	46·87	1·00	.....	1·00	194·3
November	70	7	0	17	36·04	1·82	10·00	2·82	68·2
December	47	9	-31	28	16·24	1·23	7·00	1·93	57·1
Total	.....	.....	.....	.....	.....	34·33	80·00	42·33	1,808·4

733—1½

EXTREME HIGHEST, EXTREME LOWEST AND MEAN TEMPERATURES AT LENNOXVILLE, QUE. 1915–24

Month	1915			1916			1917			1918			1919		
	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean
January	52	−46	15·46	49	−28	21·98	43	−40	10·16	37	−45	2·16	43	−27	16·45
February	44	−19	18·10	46	−35	11·58	40	−36	5·55	49	−33	9·75	44	−20	15·66
March	48	4	22·79	58	−22	15·39	53	−20	22·91	57	−25	22·72	60	1	27·55
April	79	16	44·51	68	18	40·89	63	13	37·96	74	15	39·93	68	0	37·43
May	82	26	48·83	80	23	51·00	77	26	45·38	87	27	55·87	77	25	51·75
June	85	31	58·85	79	35	59·00	84	40	60·21	83	30	55·63	93	30	64·33
July	87	40	63·79	90	41	68·35	90	40	67·61	90	38	65·85	92	40	65·82
August	85	30	63·11	91	40	64·67	92	45	65·12	88	30	62·27	83	35	62·19
September	89	24	57·18	80	32	55·41	79	24	52·78	78	23	51·85	83	26	54·81
October	73	19	46·19	78	22	45·07	67	23	42·19	71	20	45·54	74	18	43·93
November	59	13	33·75	65	0	30·49	49	−13	25·12	53	9	32·46	58	− 4	32·14
December	42	0	24·09	49	−30	16·56	40	−45	5·74	48	−18	20·75	45	−23	11·37

Month	1920			1921			1922			1923			1924		
	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean
January	35	−44	1·60	44	−26	11·27	40	−35	8·58	39	−35	5·39	45	−28	15·17
February	44	−47	12·65	48	−16	16·76	47	−37	14·28	35	−43	3·38	40	−29	5·77
March	35	9	38·01	78	15	46·28	60	−10	27·98	47	−36	16·80	51	− 3	29·45
April	66	33	27·66	70	11	34·11	67	12	40·21	77	− 5	37·42	69	7	39·06
May	83	21	49·25	87	22	53·36	85	20	53·12	78	25	49·48	75	19	48·45
June	85	35	59·44	91	30	60·14	86	37	62·48	89	31	59·45	80	31	58·79
July	85	38	64·15	99	42	72·18	87	42	65·32	85	39	61·95	88	44	66·11
August	88	40	68·59	85	31	62·09	86	36	62·56	85	30	59·17	87	39	63·99
September	86	25	56·59	88	30	58·23	88	26	56·05	83	26	56·35	79	26	54·23
October	72	25	49·75	68	17	44·40	81	16	44·25	77	17	44·71	75	20	46·87
November	53	6	29·94	63	− 6	28·00	57	9	34·31	62	10	33·24	70	0	36·04
December	45	−21	21·12	53	−29	15·98	53	−32	14·19	55	−11	28·92	47	−31	16·24

PRECIPITATION AT LENNOXVILLE, QUE., 1915-24

Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	Ave. 10 yrs.
January	1·40	3·63	3·59	2·20	1·90	2·11	1·40	2·00	3·30	4·90	2·64
February	2·12	2·43	0·85	1·77	1·23	1·90	1·27	2·73	2·35	1·55	1·82
March	1·80	1·60	1·60	1·60	2·22	3·09	3·07	2·09	3·20	5·95	2·62
April	1·84	2·34	1·24	1·21	2·68	4·62	2·09	3·25	4·16	3·60	2·70
May	1·72	4·20	2·25	2·32	2·99	1·28	0·74	1·50	2·99	2·30	2·03
June	2·06	4·72	7·38	4·41	3·19	2·22	1·78	10·34	3·43	1·89	4·14
July	4·89	5·68	3·97	2·62	3·18	7·66	3·25	2·12	2·87	5·13	4·14
August	3·47	3·91	8·27	2·39	3·59	4·70	1·87	4·75	2·33	4·72	4·00
September	2·70	5·64	1·78	8·55	4·31	4·45	1·49	1·28	3·24	6·54	3·99
October	3·45	2·59	5·43	6·19	6·63	2·55	3·94	3·33	3·64	1·00	3·87
November	2·12	2·67	1·05	3·65	2·74	2·65	3·70	1·45	3·48	2·82	2·63
December	2·26	2·33	2·55	2·89	1·05	5·31	1·49	1·45	1·83	1·93	2·31
Totals	29·83	41·74	39·96	39·80	35·71	42·54	26·09	36·29	36·82	42·33	36·89

ANIMAL HUSBANDRY

WINTERING FATTENING OF STEERS

It has been the custom, since the inception of this Station, to purchase ninety stockers in the autumn for winter feeding, with two objects in view, namely, to be able to carry on different lines of experimental work, and to create a market for the surplus roughage, such as hay and ensilage, produced on the farm. The following is a brief report of the tests which were carried on in 1924.

WINTER FATTENING OF STEERS IN PENS VERSUS TIED

Object of Experiment.—To determine the relative merits of the two methods of housing steers for winter feeding, namely, loose in a large pen versus tied in stable.

Plan of Experiment.—Two uniform lots of ten steers each were compared; lot 1 was wintered in a large pen adjoining the stable and lot 2 was tied in the main stable. Commencing November 1, all steers were fed 10 pounds of hay and 30 pounds of corn and sunflower ensilage per day for the period. Beginning December 1, both lots received 2½ pounds of meal each per day which was increased one pound per day the first of each month through the feeding period. The meal mixture consisted of standard elevator screenings, 5 parts; corn meal, 2 parts; and after March 1, oil meal, 1 part. The steers cost $5.50 per hundred on November 1, 1923, and sold for $7.35 per hundred on May 2, 1924.

WINTER FEEDING OF STEERS LOOSE VS. TIED

—		1924		Average for six years	
		Loose	Tied	Loose	Tied
Number of steers in each lot	no.	10	10	10	10
Initial weight, average	lb.	905	963	854	966·6
Finished weight, average	"	1,106	1,147	1,101·5	1,198
Average gain per steer	"	201	184	247·6	231·1
Average daily gain per steer	"	1·09	1·00	1·35	1·25
Amount of hay eaten per pound gain	"	9·15	10·00	7·69	8·25
Amount of ensilage eaten per pound gain	"	27·99	30·00	20·75	22·16
Amount of meal eaten per pound gain	"	3·45	3·77	2·99	3·29
Cost of feed per pound gain	cts.	13·13	14·35	12·30	13·23

Deductions.—The above table shows that larger and cheaper gains were obtained with steers wintered loose not only in 1924, but also for an average of six years during the time that this experiment has been underway. When the question of the saving of labour and housing equipment is considered, and also that the gains made cost nearly one cent per pound less, it proves quite conclusively that feeding steers loose in pens is the most profitable.

BARLEY MEAL VS. MEAL MIXTURE

Object of Experiment.—To ascertain the value of marketing barley by feeding it to steers and comparing it with a meal mixture.

Plan of Experiment.—This experiment was commenced November 1, 1923, with two lots of eight steers each. Both lots received 10 pounds of hay and 30 pounds of corn and sunflower ensilage per day for a period of 184 days. Commencing December 1, 1923, both lots were started on 2½ pounds of meal, and this increased 1 pound per day on the first of each month during the period.

BARLEY MEAL VS. MEAL MIXTURE.

—	Barley meal	Meal-mixture
Number of steers in each lot.....No.	8	8·00
Number of days in experiment.....days	184·00	184·00
Initial weight, average.....lb.	1,014·50	1,081·50
Finished weight, average..... "	1,203·00	1,265·50
Average gain per steer..... "	188·50	184·00
Average daily gain per steer..... "	1·02	1·00
Amount of hay eaten per pound gain..... "	9·76	10·00
Amount of ensilage eaten per pound gain..... "	29·28	30·00
Amount of meal eaten per pound gain..... "	3·68	3·77
Cost of feed per pound gain.....cts.	14·10	14·35

Deductions.—The results obtained from this experiment show that a slightly better gain was made by the lot fed barley and that this crop, marketed by feeding it to steers, realized $2.17 per hundred. At the same time barley was sold by feed merchants for $1.50 per hundred, which shows that 77 cents per hundred more was realized by marketing it through live stock than could have been procured otherwise and, at the same time, much was done to help keep up the fertility of the soil.

DEHORNING EXPERIMENT

Object of Experiment.—To determine the effect of dehorning stockers when tied in stable November 1, 1923, at age of 2½ years, compared with steers dehorned when young.

Plan of Experiment.—Two lots of four steers each were compared. One lot was dehorned when tied in the stable November 1, and the other lot was dehorned when young. Commencing November 1, all steers were fed 10 pounds hay and 30 pounds of corn and sunflower ensilage per day for the period. Beginning December 1, both lots received 2½ pounds of meal each per day, which was increased one pound per day the first of each month throughout the feeding period. The meal mixture consisted of standard elevator screenings, 5 parts; corn meal, 2 parts; and after March 1, oil meal, 1 part.

DEHORNING EXPERIMENT

—		Dehorned when young	Dehorned Nov. 1
Number of steers in each lot	No.	4	4
Number of days in experiment	days	184	184
Initial weight, average	lb.	1,081·50	1,007·50
Finished weight, average	"	1,265·50	1,166·00
Average gain per steer	"	184·00	158·50
Average daily gain per steer	"	1·00	0·86
Amount of hay eaten per pound gain	"	10·00	11·60
Amount of ensilage eaten per pound gain	"	30·00	34·82
Amount of meal eaten per pound gain	"	3·77	4·38
Cost of feed per pound gain	cts.	14·35	16·66

Deductions.—The lot that was dehorned, when tied in the stable, took considerable time to recover from the shock, and therefore did not make as good gains. One of the steers lost a good deal of blood, which caused quite a difference in the weights. It is therefore advisable that all steers raised for beef production should be dehorned young. Dehorned steers are preferable for export as well as for marketing locally.

THE VALUE OF HOME-GROWN ROUGHAGE MARKETED THROUGH STEERS

In order to determine the value of hay and ensilage fed to steers, careful records were kept on a lot of 47 steers fattened at the Station during the winter 1923-24. The steers were purchased locally in the fall and sold in May after 208 days of winter feeding. Each steer was fed 10 pounds of hay and 30 pounds of corn and sunflower ensilage per day. Beginning December 1, they received 2½ pounds of meal per day per steer, which was increased one pound per day the first of each month during the feeding period. The meal mixture consisted of standard elevator screenings, 5 parts; corn meal, 2 parts; and after March 1, oil meal, 1 part.

These steers were purchased for $5.50 per hundred on October 25, 1923, and sold on May 26, 1924, for $7.35, which allowed a spread of $1.85 per hundred. The following is a statement of the costs, gains made and amount of feed per pound gain.

THE CALCULATED VALUE OF HOME-GROWN ROUGHAGE MARKETED THROUGH STEERS

Number of steers fed	No.		47
Number of days fed in stable	days		208
Cost Nov. 1, 1923, 45,261 pounds at 5·5 cents	$	2,489	35
Value May 26, 1924, 54,990 pounds at 7·35 cents	$	4,041	77
Gain in value in 208 days	$	1,552	42
Initial weight, average	lb.	963	
Finished weight, average	"	1,170	
Average gain per steer	"	207	
Average daily gain per steer	"		0·995
Amount of hay eaten per pound gain	"		10·04
Amount of ensilage eaten per pound gain	"		30·14
Amount of meal eaten per pound gain	"		4·27
Profit on 47 steers	$	193	74
Profit per steer	$	4	12
Cost of meal fed	$	648	60
Interest on $2,489.35 for 6 months at 6 per cent	$	74	68
Total expenses (not including cost of hay and ensilage)	$	723	28
Increase in value of 47 steers	$	1,552	42
Total cost (not including cost of hay and ensilage)	$	723	28
Calculated value of hay and ensilage marketed through steers	$	829	14

There is no method by which the value determined above for the hay and ensilage can be exactly proportioned between these two crops without conducting a comparative feeding test, but a fairly accurate value can be arrived at on the basis of the total digestible nutrients each contains. According to "Henry's Feeds and Feeding", mixed hay contains 924 pounds of digestible nutrients per ton. Good corn ensilage, according to the same authority, contains nearly 360 pounds of digestible nutrients per ton. As the ensilage fed at this Station contained a small percentage of immature corn, mixed with sunflowers, it is probable that it contained no more than 300 pounds of total digestible nutrients per ton. Calculated on this basis, the proportion of the increase in value credited to hay would be $420.01 and to ensilage $409.13. The 47 steers consumed 48·88 tons of hay which would give it a value of $8.59 marketed through the steers. The average cost of producing hay at the Station in 1923 was approximately $7 per ton. Calculating in the same manner, ensilage was worth $2.79. The cost of producing this ensilage in 1923 was $2.77 per ton. The profit realized on the hay fed to this lot of steers was, therefore, $1.59 per ton, and on the ensilage 2 cents per ton.

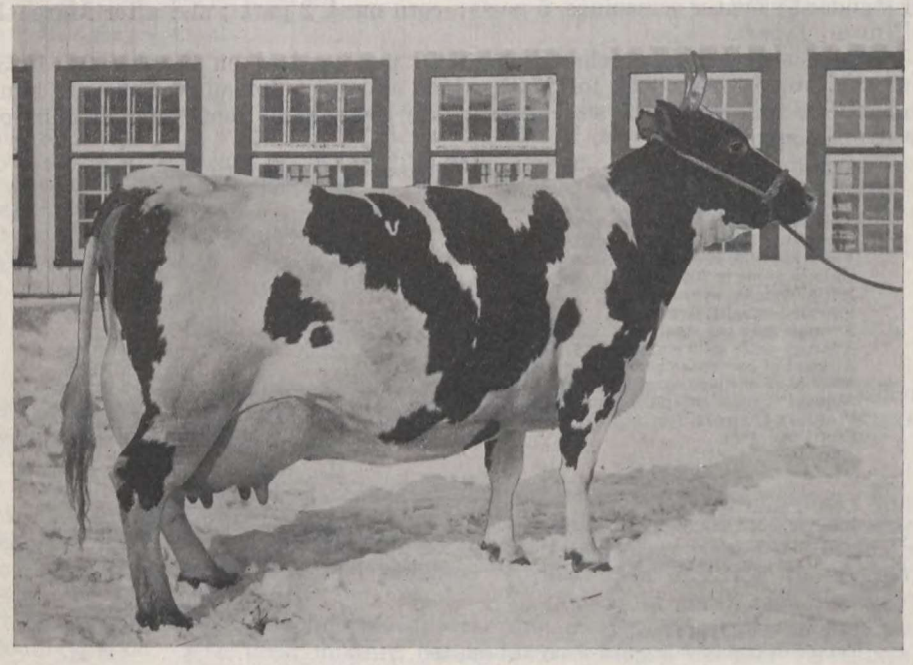
In estimating the cost of feeds for the different experiments with beef cattle the following values were used:—

Screenings	per ton $	26 50
Corn meal	"	39 00
Oil meal	"	44 60
Barley	"	31 00
Hay	"	8 00
Ensilage	"	3 00

DAIRY CATTLE

AYRSHIRES

The Ayrshire herd, at present, consists of the herd sire, "Ottawa Masterpiece"—77928—bred at the Central Experimental Farm, Ottawa; twenty cows;



Lennoxville Roxie—55864. One of the best of the Ayrshire herd.

two two-year-old heifers; two yearling heifers; and ten calves. The increase in this herd has not been as rapid as might be wished, for different reasons, one in particular being the large percentage of male calves.

JERSEYS

This herd is headed by the noted, well-bred bull, "Rower Golden Maid's Prince,"—11841—, and consists of six cows, five yearlings and one calf all of which are making good progress. Three of these yearlings were purchased at the Quebec Jersey Cattle Club sale held at Foster, Que., in June, 1924.

SHORTHORNS

The dual-purpose Shorthorn bull, "Weldwood Lassie's Lad"=135100= is still heading the herd. This bull is noted for the excellent milk records behind him. There are also ten cows, one two-year-old heifer, three yearlings and six calves, making a total of twenty-one head. During the year, one of the cows, "Jubilee 18th"=160583= qualified in Record of Performance with 11,778 pounds of milk and 619 pounds of butter.

The table gives the individual milk records for the cows and heifers which finished a lactation period during the year 1924.

INDIVIDUAL MILK RECORDS COMPLETED DURING THE YEAR

Name and Breed of Cow	Age at beginning of lactation period	Date of dropping calf	Number of days in the lactation period	Total pounds of milk for period	Daily average yield of milk	Average p.c. fat in milk	Pounds of butter produced in period	Value of butter at 40c. per pound	Value of skim milk at 25c. per cwt.	Total value of product	Amount of meal eaten at $1.50 per cwt.	Amount of roots, ensilage and green feed at $3.00 per ton	Amount of hay eaten at $8.00 per ton	Months pasture at $1.50 per Month	Total cost of feed	Cost to produce 100 lb. of milk	Cost to produce 1 lb. of butter skim-milk neglected	Profit on 1 lb. of butter skim-milk neglected	Profit over cost of feed per cow
	yrs.			lb.	lb.	p.c.	lb.	$ cts.	$ cts.	$ cts.	lb.	lb.	lb.	mos.	$ cts.	$ cts.	cts.	cts.	$ cts.
Lennoxville Pansy.....A	3	Aug. 16, 1923	365	12,246	33·55	4·23	609·42	243 76	29 09	272 85	3,737	11,166	1,635	5·0	86 84	0 71	14·2	25·8	186 01
Jubilee 18th.....S	5	Nov. 20, 1923	315	11,778	37·39	4·47	619·38	247 75	27 89	275 64	3,443	11,203	2,103	5·5	85 10	0 72	13·7	26·3	190 54
Maplehurst Tox's Roxana.....J	4	Jan. 4, 1924	362	9,638	26·62	5·31	602·09	240 84	22 59	263 43	3,110	9,928	1,578	5·5	76 10	0 79	12·6	27·4	187 33
Lennoxville Beauty 3rd.....A	2	Nov. 1, 1923	353	9,573	27·12	4·89	550·72	220 29	22 55	242 84	2,918	9,880	1,740	5·5	73 80	0 77	13·4	26·6	169 04
Lennoxville Roxie.....A	7	Feb. 11, 1924	265	8,680	32·75	4·22	430·93	172 37	20 62	192 99	2,468	5,628	1,245	5·5	58 69	0 67	13·6	26·4	134 30
Highland Betsy 2nd.....A	3	Feb. 2, 1924	272	8,011	29·45	4·13	389·24	155 70	19 05	174 73	2,527	8,173	1,535	5·5	64 55	0 80	16·6	23·4	110 20
Lennoxville Roxie 2nd.....A	4	Dec. 29, 1923	252	7,411	29·40	3·94	343·52	137 41	17 67	155 08	2,287	10,173	1,671	3·5	61 49	0 83	17·9	2..·1	93 59
Brampton Princess Lucy.....J	5	May 13, 1923	340	6,252	18·39	5·95	437·64	175 05	14 53	189 58	2,554	8,306	1,613	5·5	65 47	1 04	14·8	25·2	124 11
Lennoxville Dairymaid 2nd.....A	4	Jan. 30, 1924	227	5,311	23·39	4·05	253·05	101 22	12 64	113 86	1,559	4,838	1,122	5·5	43 38	0 81	17·1	22·9	70 48
Lady Hope 10th.....S	4	Oct. 2, 1923	284	4,848	17·07	4·62	268·50	105 40	11 46	116 86	1,765	8,141	2,055	4·0	52 90	1 09	20·0	20·0	63 96
Lennoxville Susie.....A	4	Aug. 17, 1923	257	4,671*	18·17	4·01	220·38	88 15	11 13	99 28	1,759	8,776	1,810	3·0	51 28	1 09	23·2	16·8	48 00
Lady Hope 9th.....S	6	Nov. 4, 1923	285	4,590	16·17	3·71	200·34	80 14	10 97	91 11	1,644	8,296	2,172	5·5	54 04	1 17	26·9	13·1	37 07
Lennoxville Mary 3rd.....A	3	Jan. 25, 1924	260	4,530	17·42	4·25	226·50	90 60	10 76	101 36	1,603	4,023	1,330	5·0	42 89	0 94	18·9	21·1	58 47
Eva of Avonmore.....A	11	Nov. 1, 1923	290	4,303*	14·84	3·78	191·38	76 55	10 28	86 83	1,473	5,946	1,728	5·5	46 17	1 07	24·1	15·9	40 66
Gem of Maple Grove.....S	5	Feb. 7, 1924	219	3,514	16·04	4·31	178·18	71 27	8 34	79 61	1,362	5,528	1,475	4·0	40 62	1 15	22·7	17·3	38 99
Lennoxville Dairymaid 4th.....A	2	Feb. 13, 1924	213	3,508	16·46	4·27	176·22	70 49	8 33	78 82	1,358	4,208	1,285	4·5	38 57	1 09	21·8	18·2	40 25
Average.....	.....	.....	285	6,801	23·87	4·38	355·84	142 34	16 12	158 46	2,223	7,763	1,631	4·5	58 26	0 85	16·4	23·6	100 20

HORSES

The horses at the Station include the imported Shire stallion, "Snelston Topper" [1608] (38528), which was presented to the Canadian Government by Mrs. Staunton, Snelston Hall, Ashbourne, England. He has developed into a splendid specimen of his breed. He was bred to fifty mares in 1923, and has to his credit thirty foals of promising appearance. This horse was shown at the Great Eastern Exhibition, Sherbrooke, Que., and also at the Cookshire Exhibition, where he attracted much attention. There are fifteen draft horses at the Station, including two brood mares, one carriage horse and one foal from the Shire stallion.

COST OF HORSE LABOUR

In order to arrive at the cost of horse labour performed for the different divisions by the fifteen horses, the following table gives the cost per hour and how this was determined:—

COST OF HORSE LABOUR

Number of work horses	No.	15
Average value of each horse	$	200
Total hours' work done during year by 15 horses	hrs.	21,900
Average hours' work done during year per horse	"	1,460
57,660 lbs. oats at $1.60 per cwt. (Fifteen horses)	$	922 56
7,594 lbs. bran at $1.25 per cwt. "	$	94 92
78,384 lbs. hay at $8.00 per ton "	$	313 54
Total cost of feed for 15 horses for 12 months	$	1,331 02
Average cost of feed per horse for 12 months	$	88 73
Cost of feed for 15 horses	$	1,331 02
Labour (stable attendance), 2,190 hours at 30 cents per hour	$	657 00
Interest (6 per cent on $3,000, value of 15 horses)	$	180 00
Shelter, $20 per horse	$	300 00
Harness and repairs	$	90 00
Miscellaneous (including shoeing, veterinary services and sundries)	$	178 00
Total cost of 21,900 hours horse labour	$	2,736 02
Average cost per hour of horse labour	cts.	12·49

The above table shows that horse labour cost 12·49 cents per hour. This rate may seem a little high, but the point has to be taken into consideration that a certain number of horses have to be kept the whole year in order that there may be sufficient horses to do the team work at seeding time as well as haying and harvesting. The horses not required for work in the winter months are allowed to run in a yard during the day and kept in large box stalls at night. They are fed a ration of 16 pounds of good hay and 25 pounds of ensilage per day. On the first of April the idle horses are tied in the stable and fed a light grain ration, which is gradually increased as they are given a certain amount of work to do, in order that they may be in good condition for the spring's work.

SHEEP

Only one breed of sheep, the Oxford Down, is kept at the Station. The flock consists of one registered ram ("Johnston D7"—20429—), thirteen registered ewes, three registered lambs, thirty-six high-grade ewes and nine grade lambs. The forty-three ewes bred in the fall of 1923, dropped seventy-four lambs, of which sixty-two lambs were saved, a percentage of 1.44. These lambs were born in April and got a fairly good start before they were turned to pasture. They were weaned September 1, and turned on to good clover pasture. Forty-one lambs were shipped directly to a packing firm in Montreal

and sold for 10.5 cents per pound net. Nine registered ram lambs, seven grading three stars, and two grading two stars, were sold for breeding purposes, and three registered and nine grade ewe lambs were kept in the flock for breeding purposes. The shearing was done in April, and the fleeces averaged 7.66 pounds. Fifty-eight per cent of the clip graded medium combing and brought 35 cents per pound, while 42 per cent graded low medium combing and sold for 30 cents per pound. The wool was graded and sold through the Canadian Co-operative Wool Growers' Association, which has its grading station for this province at Lennoxville. This organization has done much to encourage sheep breeding in the Eastern Townships.

COST OF KEEPING A BREEDING FLOCK

Number of ewes	No.	43
Value of ewes at $12 per head	$	516 00
Value of ram	$	40 00
Cost of feed for 43 ewes:—		
13,990 lbs. hay at $8 per ton	$	55 96
13,416 lbs. ensilage at $3 per ton	$	20 12
11,868 lbs. roots at $3 per ton	$	17 80
6,794 lbs. meal at $31 per ton	$	105 30
5·5 months pasture at 20 cents per head per month	$	47 30
Total cost of feed for 43 ewes	$	246 48
Interest on investment; 6 per cent of $516 (value of ewes)	$	30 96
Depreciation or replacement charge; 10 per cent of $516	$	51 60
Total charge against ewes	$	329 04
Average charge per ewe	$	7 65
Value of wool per fleece; 7·66 lbs. at 32·35 cents	$	2 47
Average cost of keeping ewes (less value of fleece)	$	5 18
Average cost of feed per ewe	$	5 75

COST OF FEED FOR RAM

360 lbs. hay at $8 per ton	$	1 44
369 lbs. roots at $3 per ton	$	0 55
312 lbs. ensilage at $3 per ton	$	0 47
320 lbs. meal at $31 per ton	$	4 96
5·5 months pasture at 20 cents per head per month	$	1 10
Total cost of feed for ram for one year	$	8 52
Interest on investment; 6 per cent of $40 (value of ram)	$	2 40
Depreciation charge; 25 per cent of $40	$	10 00
Total charge against ram	$	20 92
Value of fleece, 8 pounds at 32·35 cents per pound	$	2 59
Cost of keeping ram (chargeable against lambs)	$	18 33

COST OF RAISING LAMBS TO MARKET AGE

Number of lambs saved from 43 ewes	No.	62
Average number of lambs saved per ewe	"	1·44
Average weight of lambs at birth	lbs.	9·63
Average weight of lambs, October 11	"	84·00
Average value of lambs at 10·5 cents per pound	$	8 82
Cost of keeping 43 sheep (less value of wool)	$	222 74
Three months pasture for 62 lambs at 20 cents per head per month	$	37 20
Cost of keeping ram (less value of fleece)	$	18 33
Cost of extra labour at lambing time	$	20 00
Medicine	$	4 63
Total cost of raising 62 lambs to market age	$	302 90
Average cost of raising a lamb to market age	$	4 88

It may be noted from the above figures that it actually cost, all charges being reckoned and value of wool deducted, $4.88 to raise a lamb to market age and, with a production of 1.44 lambs per ewe, that each ewe made a profit of $7.04.

SWINE

The Yorkshire is the only breed of swine kept at this Station. The herd consists of one boar, four brood sows and thirty-eight young pigs. During the year, ninety-eight market hogs, totalling 20,201 pounds, were sold. Of these only forty-eight were sold on a graded basis. Of this lot, thirty-three graded select, twelve thick smooth and three heavies.

During the summer the brood sows are kept on pasture, the sows receiving a small allowance of grain to supplement the pasture. During the winter they are kept in yards provided with colony houses for shelter. They are fed a meal ration composed of screenings, 4 parts; bran, 2 parts; and oats, 1 part; fed at the rate of 1.5 pounds per hundred pounds live weight.

COST OF RAISING YOUNG PIGS

The following statement is made up from the records kept on six brood sows during 1924. Four weeks previous to farrowing, the sows were fed a meal ration made up of equal parts ground oats, middlings and screenings. Skim-milk was fed when it could be obtained or a small quantity of tankage to take its place. The young pigs from three to six weeks of age received ground oats and sweet skim-milk in addition to the mother's milk.

COST OF RAISING PIGS TO WEANING AGE

Number of sows bred	No.		6
Number of litters farrowed per sow	"		2
Total number of pigs saved	"		98
Average number of pigs saved per sow	"		16·3
Cost of feed—			
4,630 lbs. screenings at $1.30 per cwt	$	60	19
1,250 lbs. middlings at $1.80 "	$	22	50
2,912 lbs. ground oats at $2 "	$	58	24
2,110 lbs. bran at $1.30 "	$	27	43
610 lbs. barley at $1.55 "	$	9	46
70 lbs. tankage at $3 "	$	2	10
210 lbs. oil meal at $2.25 "	$	4	73
511 cwt. skim-milk at $0.25 "	$	12	78
2,600 lbs. roots at $0.15 "	$	3	90
Sulphur, salt, etc	$	2	50
Total cost of feed for sows and young pigs to weaning age	$	203	83

All costs pertaining to the upkeep of the sows are charged against the young pigs, with the exception of labour and housing charges, which are considered to be offset by the value of the manure. Each sow is valued at $40 in order to arrive at the interest charge.

Total cost of feed for sows and young pigs to weaning age	$	203	83
Extra labour required at farrowing time	$	28	00
Cost of service at $2	$	24	00
Interest on $240 for 1 year at 6 per cent	$	14	40
Total cost of 98 young pigs	$	270	23
Average cost per pig at weaning age	$	2	76

BARLEY VS. STANDARD ELEVATOR SCREENINGS VS. MEAL MIXTURE

Object of Experiment.—To compare the value of barley with standard elevator screenings and with a meal mixture of barley, middlings, screenings and oil meal.

Plan of Experiment.—On January 2, twenty-seven pigs, four months old, were divided into three lots of nine each, as evenly as possible. Lot 1 was fed clear barley; lot 2, clear screenings; and lot 3, a mixture of barley, 6 parts, middlings, 2 parts, screenings, 1 part, oil meal, 1 part. Each lot received 10 per cent of tankage added to their meal mixture as well as 1,000 pounds of roots and 2,595 pounds of skim-milk, and also a certain amount of salt, sulphur and charcoal which was valued at 60 cents.

PRICES CHARGED FOR FEEDS

Barley	per ton	$32 00
Screenings	"	26 00
Middlings	"	36 00
Oil meal	"	45 00
Tankage	"	60 00
Roots	"	3 00
Skim-milk	per cwt.	25

COMPARISONS OF BARLEY, STANDARD ELEVATOR SCREENINGS AND MEAL MIXTURE

		Lot 1	Lot 2	Lot 3
		Barley	Screenings	Meal mixture
Number of hogs in experiment	No.	9	9	9
Initial weight, gross	lbs.	1,026	1,017	1,026
Initial weight, average	"	114	113	114
Number of days on test	days	72	72	72
Finished weight, gross	lb.	1,944	1,836	1,980
Finished weight, average	"	216	204	220
Total gain for period	"	918	819	954
Average gain per hog	"	102	91	106
Average daily gain per hog	"	1·42	1·26	1·47
Amount of meal eaten for period	"	3,100	3,600	2,990
Amount of skim-milk eaten for period	"	2,595	2,595	2,595
Amount of roots eaten for period	"	1,000	1,000	1,000
Amount of tankage, 10 per cent eaten for period	"	310	360	299
Amount of sulphur, salt, charcoal	cts.	60	60	60
Amount of meal eaten per pound gain	lb.	3·38	4·39	3·13
Amount of skim-milk eaten per pound gain	"	2·81	3·17	2·72
Amount of roots eaten per pound gain	"	1·09	1·22	1·05
Amount of tankage eaten per pound gain	"	0·34	0·44	0·31
Total cost of feed	$	67 49	66 19	67 63
Cost of feed per head	$	7 50	7 35	7 51
Cost of feed per head per day	cts.	10·4	10·2	10·43
Cost of feed per pound gain	"	7·35	8·08	7·09

Deductions.—It will be noted that lot 3, fed a meal ration of barley, middlings, screenings and oil meal, led with a gain of 1.47 pounds per day at a cost of 7.09 cents per pound. Lot 1, fed clear barley, made a gain of 1.42 pounds per day at a cost of 7.35 cents per pound and lot 2, fed clear screenings gained 1.26 pounds per day costing 8.08 cents per pound gain. The order of economy of these feeds at prices charged is, therefore: first, meal mixture; second, barley; and third, screenings.

METHODS OF FEEDING

Objects of Experiment.—To ascertain the relative economy of:

(1) Feeding full vs. limited grain ration to hogs on pasture. (See lots 1 and 2.)

(2) Hand-feeding and self-feeding on pasture. (See lots 1 and 3.)

(3) Hand-feeding on pasture and hand-feeding with soiling crop inside. (See lots 1 and 4.)

(4) Self-feeding on pasture and self-feeding with soiling crops inside. (See lots 3 and 5.)

(5) Hand-feeding inside and self-feeding inside, both with soiling crop. (See lots 4 and 5.)

Plan of Experiment.—Forty-five Yorkshire pigs, averaging 66 pounds each, were selected on June 23 for this experiment and divided into five lots of nine each. Three lots were turned into yards of one-third of an acre each, which had been sown early in the season to a mixture of oats, vetches and rape. Two lots were kept inside and fed cut green feed. All lots received the same amount

of skim-milk. The grain mixture consisted of barley, 4 parts, ground oats, 2 parts, screenings, 2 parts, corn, 1 part, middlings, 1 part, and tankage, five per cent. Each lot had charcoal, sulphur and salt, which has been charged to each group at 60 cents.

PRICES CHARGED FOR FEEDS

Barley	per ton	$32 00
Ground oats	"	36 00
Screenings	"	26 00
Corn	"	40 00
Middlings	"	36 00
Tankage	"	60 00
Skim-milk	per cwt	0 25

In explanation of the following table, it should be stated that the green feed appears in the table as a certain part of an acre per group. Each lot which was fed outside had a yard of one-third of an acre in area. Lot 2, fed a light grain ration, consumed all their green feed. Lots 1 and 3 had sufficient in their yards to cut for lots 4 and 5 that were housed inside. Therefore, lots 1, 3, 4 and 5 were charged one-sixth of an acre, and lot 2, one-third of an acre. The cost of green feed added to the other feed was as follows: Lots 1, 3, 4 and 5, $2.66, and lot 2, $5.33. These charges were calculated on the following basis:—

Rent of one acre of land	$ 6 00
Ploughing, disking and sowing	6 50
Seed	3 50
Cost of one acre of green feed	$16 00

METHODS OF FEEDING

—		Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
		Full grain ration (hand fed) on pasture	Limited grain ration (hand fed) on pasture	Full grain ration by self-feeder on pasture	Full grain ration (hand fed) inside with green feed	Full grain ration by self-feeder inside with green feed
Number of hogs in experiment	No.	9	9	9	9	9
Initial weight, gross	lbs.	522	540	594	603	720
Initial weight, average	"	58	60	66	67	80
Number of days on test	days	112	112	112	112	112
Finished weight, gross	lbs.	1,676	1,698	1,693	1,921	1,966
Finished weight, average	"	186·2	188·7	188·1	213·4	218·4
Total gain for the period	"	1,154	1,158	1,099	1,318	1,246
Average daily gain per hog	"	1·14	1·15	1·09	1·30	1·24
Amount of meal eaten for period	"	4,410	3,445	4,576	4,780	5,454
Amount of tankage eaten for period	"	220	172	229	239	273
Amount of green feed eaten for period	acre	0·167	0·333	0·167	0·167	0·167
Amount of skim-milk eaten by group	lbs.	1,600	1,600	1,600	1,600	1,600
Amount of meal eaten per lb. gain	"	3·82	2·97	4·17	3·62	4·37
Amount of tankage eaten per lb. gain	"	0·19	0·15	0·21	0·18	0·22
Amount of skim-milk eaten per lb. gain	"	1·38	1·38	1·45	1·21	1·28
Total cost of feed	$	86·19	71·58	89·13	92·81	114·83
Cost of feed per head	$	9·58	7·95	9·90	10·31	12·76
Cost of feed per head per day	cts.	8·55	7·09	8·84	9·20	11·39
Cost of feed per lb. gain	"	7·46	6·18	8·11	7·04	9·22
Standing as regards largest gains		4th	3rd	5th	1st	2nd
" " cheapest gains		3rd	1st	4th	2nd	5th
" " meal consumed per pound gain		3rd	1st	4th	2nd	5th
Order of preference on basis of above three placings		3rd	1st (equal with lot 4)	5th	1st (equal with lot 2)	4th

Deductions.—(1) Comparing lots 1 and 2, it will be seen that lot 2, on a limited grain ration, i.e., 3.6 pounds per day is compared to 4.6 pounds per day, gave the larger and cheaper gains, due to the increased consumption of green feed, showing that pasture can be quite profitably employed in raising hogs for bacon purposes. It is necessary to reduce slightly the grain fed to ensure the pasture being made use of.

(2) Comparing lots 1 and 3, it will be seen that lot 1 on full grain ration, hand-fed, on pasture, made larger and cheaper gains than lot 3 on full grain ration, fed through a self-feeder on pasture. Lot 3 consumed the most grain but did not make as profitable a use of it as the hand-fed lot.

(3) Comparing lots 1 and 4, it will be seen that lot 4 on a full grain ration, hand-fed, inside, with the addition of soiling crop, made greater and cheaper gains than lot 1 on a similar ration on pasture, but not as cheap gains as lot 2 on limited grain ration on pasture.

(4) Comparing lots 3 and 5, it will be seen that lot 5, self-fed inside with soiling crop, made greater but also more expensive gains than lot 3, self-fed on pasture. Lot 5, however, consumed the most grain per pound gain of any lot in the experiment, and consequently showed the highest cost of feed per pound gain.

(5) Comparing lots 4 and 5, it will be seen that lot 4 on full grain ration, hand-fed, inside, with the addition of soiling crop, made greater and cheaper gains than lot 5, fed similiarly through the self-feeder.

If scored on points (5 for first place down to 1 for fifth place) for the standing on gains, cost of gains, and amount of meal per pound gain, as given at the foot of the preceding table, the order of preference on method of feeding would be as given in the last line of the table.

FIELD HUSBANDRY

ROTATIONS

In order to determine the most suitable rotations for this district, five different rotation systems were established in 1922. These present different sequences as well as different proportionate acreages of the various crops.

This work is carried on in a level field with fairly uniform soil conditions. The land is largely a clay loam with a clay subsoil and has all been underdrained. Each crop in the rotation occupies three-fourths of an acre, so that the work is carried on practically under field conditions. In order to get accurate results, the quantities of manure applied and the yields are carefully weighed.

ROTATION A (FIVE YEARS' DURATION)

First year—Corn.
Second year—Barley (seeded down).
Third year—Clover hay.
Fourth year—Timothy hay.
Fifth year—Oats.

This rotation provides two-fifths of the land in grain, two-fifths in hay and one-fifth in corn. Such a rotation used on a farm with 100 acres of arable land available would have 20 acres in corn, 40 acres in grain and 40 acres in hay. Under ordinary conditions it should produce 250 tons of corn ensilage, 80 tons of hay, 900 bushels of oats and 700 bushels of barley. This is a very useful rotation for many farms in Eastern Canada. In this rotation manure is applied for corn at the rate of 20 tons per acre.

ROTATION B (FOUR YEARS' DURATION)

First year—Corn.
Second year—Oats (seeded down).
Third year—Clover hay.
Fourth year—Timothy hay.

This rotation provides one-fourth of the crop in corn, one-fourth in grain and one-half in hay. Manure is applied for corn at the rate of 16 tons per acre. If such a rotation were used on a hundred acre farm, there would be 25 acres under corn, 25 acres in grain and 50 acres in hay. Under average conditions such a rotation should produce over 300 tons of ensilage, 1,200 bushels of oats and 100 tons of hay. With such a rotation the farmer would have more hay and ensilage, but less grain than if a five-year rotation were used.

ROTATION C (THREE YEARS' DURATION)

First year—Corn or potatoes.
Second year—Oats (seeded down).
Third year—Clover hay.

This rotation provides one-third of the total area in each of the three crops grown. Manure is applied on the clover sod for corn at the rate of 12 tons per acre. This is a suitable rotation in bringing light or run-out soils into a state of fertility. It is the rotation often used in districts where potatoes or other cash crops are grown. If the soil is in a very poor condition, or if large crops are required, much heavier applications of manure or fertilizers may be applied to advantage.

ROTATION D (SIX YEARS' DURATION)

First year—Corn or roots.
Second year—Barley (seeded down).
Third year—Clover hay.
Fourth year—Timothy hay.
Fifth year—Timothy hay.
Sixth year—Oats.

This rotation permits of one-sixth of the area in hoed crop, one-third in grain and one-half in hay. If used on a hundred-acre farm, it would provide 16.6 acres of corn, 33.4 acres of grain and 50 acres of hay. Under average conditions the yields of the various crops would be corn 210 tons, oats 700 to 750 bushels, barley 550 to 600 bushels and hay 100 tons. This should be a useful system where there is only a small area of permanent pasture available. In that case the second year in timothy could be pastured. Manure is applied to oat stubble for corn at the rate of 16 tons per acre, and for first year timothy as a top-dressing at the rate of 8 tons per acre.

ROTATION E—HAY AND GRAIN ROTATION

First year—Oats (seeded down).
Second year—Clover hay.
Third year—Timothy hay.
Fourth year—Timothy hay.

This rotation has one-fourth the area in grain and three-fourths in hay or pasture. It is a suitable rotation for parts of the farm so situated that it would not pay to grow corn on account of the long haul to the buildings. If manure is scarce, commercial fertilizers may be used instead. This also makes a suitable pasture rotation.

PURPOSE OF ROTATIONS

The purpose of a rotation system on a farm is to conserve soil fertility, control weeds and supply the proper balance of succulent roughage, dry roughage and grain for the requirements of the stock. On most farms it is impossible to run one rotation only. The farmer should then try out two rotations, say a four-, five- or six-year rotation on the areas near his buildings, and perhaps a hay and grain rotation on the part more removed. He may have to modify the rotations to suit his special requirements, but he should have some system of rotating his crops if he is going to keep his land in proper shape and get the best returns from it.

Every farmer has more or less capital tied up in his property on which he desires to get a reasonable rate of interest, returns for his labour and something in the nature of a dividend, if possible. The object of trying out the different rotation systems is to ascertain which one will produce crops the cheapest and at the same time keep up the fertility of the soil. As this work was only begun in 1922 it is impossible to give reliable information yet concerning the cost of producing crops on the different rotations.

COST OF PRODUCING CROPS

YIELDS AND COST OF PRODUCING CORN

Including the experimental work, there were 19 acres of corn grown for ensilage at the Station this year. The yields varied from 15.4 tons, on well-drained fertile land, to 8.06 tons on undrained land of less than average fertility. The variety grown was Compton's Early which has given the highest yield of dry matter for the last six years in the variety tests. In the following table are given the costs of the various items required in producing a crop of 13.5 tons of corn ensilage in a four-year rotation. As the records used in making up this table were kept on a field of 7.5 acres, they are applicable to general farming conditions in this district. The land is clay loam with a clay subsoil. One-half was fall ploughed and the other half spring ploughed and manure was applied in winter at the rate of 18 tons per acre. There was very little difference in yield between the fall and spring-ploughed areas.

Cost of Producing an Acre of Ensilage Corn

Item	Statement	Amount
		$ cts.
Rent of land	Interest and taxes	6 60
Manure	7·2 tons at $2 per ton	14 40
Seed	½ bushel at $2 per bush	1 00
Twine	3·5 lb. at 15·5 cents per pound	0 54
Machinery		3 00
Manual labour	29 hours at 20 cents per hour	5 80
Teamsters and tractor, operators labour	26·9 hours at 22 cents per hour	9 64
Horse labour	48·4 hours at 10 cents per hour	4 84
Tractor labour	4·2 hours at 90 cents per hour	3 78
Total cost per acre		$ 49 60
Yield per acre		13·5 tons
Total cost per ton		$ 3 67

In the foregoing table land is valued at $75 per acre, and the rent, including interest and taxes, based on that amount. Manure was applied at the rate of 18 tons per acre of which 40 per cent is charged against the corn. The charge of $2 per ton includes $1 for the value of the manure and $1 for the cost of

handling. Manual labour is charged at 20 cents per hour which is considered a fair wage for this section of the country. Teamsters and tractor operator labour cost somewhat more.

Corn silage is generally considered to have approximately three-tenths the value of well-cured hay. Farmers in this district are selling the latter for $10 per ton which would give corn ensilage a value of $3 per ton. As it costs $3.67 to produce a ton of ensilage, according to the foregoing table, the loss per ton incurred in producing it was 67 cents and the loss per acre $9.05.

COST OF PRODUCING OATS

Over 90 acres were sown to oats and mixed grain in 1924, but the yields of both were below the average, owing to unfavourable weather for ripening and harvesting. Only one field outside of the plots was ripe enough to cut in August, although all the grain was sown before May 20. Twelve acres of oats cut the second week in September were swept away by the high water on September 11. As the weather continued wet for some time it was found impossible to harvest most of the crop until late in the month, with the result that a large part of the grain was left on the fields, due to shattering.

The following statement is made up from the records kept in connection with a field consisting of 5.3 acres which was in corn in 1923:—

COST OF PRODUCING AN ACRE OF OATS

Item	Statement		Amount	
			$	cts.
Rent of land	Interest and taxes			6 60
Manure	4·8 tons at $2 per ton			9 60
Seed	3 bushel at 70 cents per bush			2 10
Twine	3 pounds at 15·5 cents per pound			0 47
Machinery				3 00
Manual labour	6 hours at 20 cents per hour			1 20
Teamsters labour	13 hours at 22 cents per hour			2 86
Tractor operators, labour	2 hours at 25 cents per hour			0 50
Threshing charges	33·4 bushel at 9 cents per bushel			3 01
Total cost per acre			$	29 34
Value of crop	33·4 bush. at 60 cents	$ 20 04		
	0·526 tons straw at $4	2 10		
				22 14
Loss per acre			$	7 20

The actual cost of raising a crop of grain does not vary much from year to year, so that the profit or loss obtained depends entirely on the yield. In order to break even on the field referred to, the yield should have been at least 45.5 bushels per acre with oats at 60 cents per bushel and straw at $4 per ton.

COST OF PRODUCING BARLEY

Only a small acreage of barley was produced at the Station in 1924 and the yield was materially lessened by the high water on September 11. The following table shows the various items entering into the cost of producing an acre of barley:—

COST OF PRODUCING AN ACRE OF BARLEY

Item	Statement	Amount
		$ cts.
Rent of land	Interest and taxes	6 60
Manure	4·4 tons at $2 per ton	8 80
Seed	2 bushel at $1.20 per bushel	2 40
Machinery		3 00
Twine	3 lb. at 15·5 cents per pound	0 47
Manual labour	6 hours at 20 cents per hour	1 20
Teamsters labour	16 hours at 22 cents per hour	3 52
Horse labour	39·2 hours at 10 cents per hour	3 92
Threshing	31 bush. at 9 cents per bushel	2 79
Total cost per acre		$ 32 70
Yield per acre	31 bushels	
Value of crop	Grain $29.45. Straw $6	$ 35 45
Profit per acre		$ 2 75
Cost per bushel		0 88

Barley can be grown anywhere throughout Eastern Canada and is one of the most useful feeds for hogs and cattle. It is especially useful in a rotation as a nurse crop, because it does not generally lodge so badly as oats. Duckbill was the variety grown on this field.

COST OF PRODUCING HAY

The acreage of hay land was considerably less in 1924 than the previous year. This was owing to a greater grain area and also to the fact that over 20 acres had been taken as night pasture for stock. Growth was checked by dry weather in June, but heavy rains during the early part of July brought the crop along. The yield off 125.7 acres was 258.5 tons, or an average yield of 2.06 tons. There was a considerable growth of second crop clover which was covered with mud by the high water and could not be cut. The following statement is made up from records kept in connection with a 20-acre field of second-year hay which gave an average yield of 2.4 tons per acre:—

COST OF PRODUCING AN ACRE OF HAY

Item	Statement		Amount
			$ cts.
Rent of land	Interest and taxes		6 60
Manure	3·2 tons at $2 per ton		6 40
Seed	Timothy, 10 pound, cost	$ 1 28	
	Red clover, 8 lb. cost	1 90	
	Alsike, 2 lb. cost	0 26	
		$ 3 44	
	Divided over two years	$ 1 72	1 72
Machinery			3 00
Manual labour	9·5 hours at 20 cents per hour		1 90
Teamsters labour	3·3 hours at 22 cents per hour		0 73
Horse labour	7·6 hours at 10 cents per hour		0 76
Total cost per acre			$ 21 11
Value per acre	2·4 tons at $10 per ton		$ 24 00
Profit per acre			$ 2 89
Cost per ton			$ 8 80

COMPARISON OF SUCCULENT ROUGHAGE CROPS

This experiment has been conducted for two years in order to determine the relative yields of the succulent roughage crops grown in this district. An acre each of corn, sunflowers, mixture of oats, peas and vetches, and swedes are grown side by side under uniform soil conditions. The root-land is ploughed soon after haying and cultivated during the summer and fall in order to get a mellow seed-bed and to control weeds. The land for oats, peas and vetches is ploughed in the fall while the land for corn and sunflowers may be either in the fall or spring. Each acre receives the same application of manure. Careful records are kept of costs and yields and samples taken for dry matter determination. In order to ascertain the demand of each crop on soil fertility, the crops of grain and hay following the root and ensilage crops should be weighed, to determine the relative yields. Unfortunately the grain crop was destroyed by the high water in 1924, so that up to the present only the yields of the succulent roughage crops for two years are available.

When calculating the cost of producing these crops, the only change from last year's prices were in the cost of horse labour which is lowered to 10 cents per hour, and the cost of manure which was raised from one dollar to two dollars per ton. Forty per cent of the cost of the total application of manure is charged against these crops which are in a four-year rotation. All other cost items as well as the return values are the same as in the general farm rotation which is the basis of most of the cost studies carried on at this Station.

COMPARISON OF SUCCULENT ROUGHAGE CROPS
Two Years' Average

Item		Corn	Sunflowers	Oats, Peas and Vetches	Swedes
Rent	$	6·60	6·60	6·60	6·60
Manure	$	13·60	13·60	13·60	13·60
Seed	$	0·94	0·93	4·26	2·12
Twine	$	0·51	0·61	.....	.....
Machinery	$	3·00	3·00	3·00	3·00
Man labour	$	11·16	12·70	6·06	26·02
Horse and tractor labour	$	9·04	10·59	5·83	10·57
Total cost per acre	$	44·85	48·03	39·35	61·91
Yield green weight	tons	9·46	15·60	6·50	23·64
Yield air-dried weight	"	1·898	3·23	2·588	2·674
Cost per ton green weight	$	4·74	3·08	6·05	2·62
Cost per ton air-dried weight	$	23·63	14·87	15·20	23·15

Loose hay is selling at the time of writing for $10 per ton which would give ensilage a market value of $3 per ton and roots somewhat less. Figuring on that basis all four crops were produced at a loss. This is due to the high rental charge and the value of $2 per ton given to the manure. For the farmer who is feeding these crops it does not matter much whether he is credited with the extra price of the manure or with a profit on his transaction as it all goes in the same pocket. However, if he had to buy manure it would present a somewhat different aspect.

Another fact worthy of notice is that roots produced the second highest amount of dry matter per acre. Although this cost practically the same as the dry matter in corn and considerably more than the dry matter in sunflowers and the oats, peas, vetches mixture, it is probably worth considerably more on account of the extra succulence of the roots themselves which have a tonic effect especially when fed to high-producing dairy cows and young stock.

COMMERCIAL FERTILIZERS

In 1923 a fertilizer experiment was conducted on a pasture field which had been ploughed up in 1922. The soil was clay loam badly run-out and overgrown with moss, bracken and hard-hack. This field was divided into four sections as follows:—

Section 1.—Eight acres received manure at the rate of 15 tons per acre.

Section 2.—One and one-half acres were sown to buckwheat which was ploughed down.

Section 3.—Two acres received a dressing of commercial fertilizer applied at the rate of 320 pounds per acre, and made up of nitrate of soda, 75 pounds and acid phosphate, 200 pounds.

Section 4.—One acre. This area received no manure or commercial fertilizer as it was used as a check.

The manure used in this experiment is valued at $2 per ton and the commercial fertilizer at $35.75 per ton, both prices including the cost of application.

The areas receiving manure and commercial fertilizers both showed substantial increases in yields of both grain and hay over the area which received no manure or fertilizer. No additional fertilizer was added in 1924, but commercial fertilizer will be added as a top dressing on timothy hay in 1925. No extra manure will be added to the manured area as the application of 15 tons in 1923 is considered sufficient for a four-year rotation.

The following table shows the effect of the two applications on the yields of grain and straw in 1922 and on the yields of hay in 1924. When calculating the cost, 40 per cent of the value of the manure was charged against grain and 30 per cent against the hay crop. Considering the comparatively light application of commercial fertilizers it may be assumed that the added fertility is completely used up by the grain and hay so that the whole cost of the first application is charged against these crops.

Comparison of Manure and Commercial Fertilizer

—		Fertilized area	Manured area	Check
Yield of grain per acre, 1923	bush.	45·8	45·9	27·9
Yield of straw per acre, 1923	tons	1·15	1·2	0·6
Yield of hay per acre, 1924	"	1·60	1·65	0·539
Increase in yield of grain, 1923	bush.	17·90	18·00	.....
Increase in yield of straw, 1923	tons	0·590	0·60	.....
Increase in yield of hay, 1924	"	1·061	1·111	.....
Value of increase		.....	.....	.....
Grain and straw, 1923	$	13 84	13 90	.....
Hay, 1924	$	10 61	11 11	.....
Total value of increase	$	24 45	25 01	.....
Cost of increase, 1923	$	5 72	12 00	.....
Cost of increase, 1924	$	.....	9 00	.....
Total cost of increase	$	5 72	21 00	.....
Total profit in two years due to increase	$	18 73	4 01	.....

The area on which buckwheat was sown has not produced a crop, so it is impossible to ascertain the increase in fertility obtained by that method. Considering the time lost in growing a green manuring crop it would seem more profitable to use either manure or fertilizer and reap the benefit the first year.

CLEARING UP ROUGH LAND

In August, 1924, an open ditch 1,391 feet long and averaging 6 feet in width was dug to drain the area of rough pasture lying along the Canadian Pacific Railway tracks. The main purpose of this ditch was to carry away the

water from the springs at the foot of the hill near the track. This water found an outlet through a winding brook, and as the ditch could only follow the brook for a very short distance, the digging entailed considerable labour. As most of the digging was done in wet, boggy ground, the use of scrapers or ditchers was out of the question and, therefore, no horse labour was used in this work. A large quantity of dynamite was used in the marshy ground to break the tough sod. The sticks were put down about six feet apart and as there was no battery available they were set off with fuse. This is not so satisfactory, especially in wet ground, as a battery. Considerable earth and tough sod were moved in this manner which lessened the amount of digging.

After harvesting was over, the field was cleared of stumps and ploughed. As it had never been cultivated, ploughing was difficult, especially in the low places, where sunken logs and tough pine roots hindered the work. The following statements show the cost of drainage, cleaning up and ploughing this field:—

COST OF DITCHING

Length of open ditch	1,391 feet
Width of open ditch	6 "
Length of ditch for tile	542 "
Cost of Open Ditch—	
510 hours of manual labour at 20 cents	$ 102 00
3 boxes of stumping powder	46 05
Total cost of 1,391 feet of open ditch	$ 148 05
Cost of Ditch for Tile—	
60 hours manual labour at 20 cents	$ 12 00
NOTE.—This was a shallow ditch which will be completed next spring.	
Cost of Ploughing and Clearing Land—	
1,640 hours manual labour at 20 cents	$ 328 00
1,830 hours horse labour at 10 cents	183 00
Total cost of ploughing and clearing 22·9 acres	$ 511 00
Average cost per acre	22 31

In the foregoing statements it will be noticed that man labour is charged at 20 cents per hour and horse labour at 10 cents per hour. That charge for man labour is somewhat lower than that paid to the men working at the Station but is a fair average for good farm labour throughout this district.

HORTICULTURE

VEGETABLES

POTATO

SPROUTING SEED POTATOES.—The practice of sprouting seed potatoes, before planting, although entailing extra labour and expense, is usually considered a good practice by market gardeners. In order to obtain information as to its value in this district, a project was started in 1923 and will be continued for at least five seasons.

The varieties recommended for the district, Irish Cobbler and Green Mountain, are used and the entire experiment is conducted in duplicate with each. The potatoes and cut sets for sprouting are placed in trays in subdued light about six weeks before planting time. As sprouts develop they are allowed more light, until, for the last week, they are kept in an open shed. For comparison with these, similar lots are kept as dormant as possible under good storage conditions. All are planted under uniform conditions, on the same date, which is as early as the season will permit. Following are the average results for the past two years:—

POTATO SPROUTING EXPERIMENT

Average of Results 1923 and 1924

Variety and Method	Date ready for use	Yield per acre	
		Marketable	Unmarketable
		bush. lb.	bush. lb.
Green Mountain—			
Small whole, dormant	Aug. 14	215 ..	53 20
Small whole, sprouted	" 2	256 40	68 20
Large whole, dormant	" 12	296 50	56 40
Large whole, sprouted	July 30	270 ..	45 ..
Cut set, dormant	Aug. 10	266 40	68 20
Cut set, sprouted	" 3	260 ..	56 40
Irish Cobbler—			
Small whole, dormant	Aug. 1	263 20	60 ..
Small whole, sprouted	July 17	205 ..	70 50
Large whole, dormant	" 29	233 30	71 40
Large whole, sprouted	" 18	143 20	86 40
Cut set, dormant	" 30	186 40	80 ..
Cut set, sprouted	" 15	208 20	61 40

AVERAGE YIELD PER ACRE

—	Dormant		Sprouted	
	Marketable	Unmarketable	Marketable	Unmarketable
	bush. lb.	bush. lb.	bush. lb.	bush. lb.
Green Mountain	259 30	62 46	262 13	57 ..
Irish Cobbler	227 50	70 33	185 33	73 1

So far the results indicate that sprouting will induce a lighter but earlier crop. Often a difference of two weeks in the time when potatoes are ready for market, will mean a great difference in price. Under such conditions, sprouting should pay even although the yield may be below that from dormant seed.

SPRAYING VS. DUSTING.—The potato-spraying experiment, which has been conducted at this Station for a number of years, demonstrated that a combination of Bordeaux mixture and calcium arsenate was the most efficient, and economical of all sprays tested, for the control of the potato beetle and the potato blights. Since the results were quite conclusive, and it was apparent that their further substantiation was unnecessary, it was decided to alter the experiment in 1923 to a comparison of the Bordeaux-calcium arsenate spray, and several commercial and home-made dust preparations. For the past two years, the experiment has been conducted in duplicate with the Green Mountain varieties. The Bordeaux-calcium arsenate spray is made up of five pounds copper sulphate, twelve pounds hydrated lime and forty gallons of water. This was applied with a small barrel "Spray Motor" and the various dust preparations were put on with a hand driven "Perfect" duster. The first applications were made on June 30, 1923, and June 24, 1924, and were repeated at necessary intervals throughout the season until the vines were killed by frost. In all, each plot received a total of five applications each season. In order to determine the killing power of the materials, the live beetles and slugs on a part of each plot were counted before and twenty-four hours after each application. At harvest the potatoes from each plot were graded and weighed. Following are the results obtained:—

SPRAYING VS. DUSTING
Average of Results, 1923 and 1924

Sprays and Dusts Used	Average percentage of beetles and slugs killed by five applications	Yield per acre	
		Marketable	Unmarketable
		bush. lb.	bush. lb.
Bordeaux 5-12-40 calcium arsenate 1 lb.	97	292 30	70 40
Hydrated lime 8 lb., calcium arsenate 1 lb., dust	94	269 30	60 50
Green Potato, dust	83	250 10	57 45
Bordeaux arsenate, dust	81	266 30	56 40
Brown apple, dust	78	238 5	61 ..

From the foregoing table it will be noted that none of the dust preparations gave as good results as Bordeaux mixture and calcium arsenate. This seemed to be as a result of their not sticking to the foliage. Bordeau mixture dries on and forms a coating that is not easily removed by showers, but the dusts tried were partially or wholly removed by the first rain following their application. During the past two seasons, rain fell at frequent intervals, thus giving the spray an advantage.

Bortox, a liquid poison supplied by the Delora Chemical Company, was tested for the first time in 1924. Several strengths of concentration were used in combination with Bordeaux mixture, but it was found that a concentration exceeding 30 fluid ounces of Bortox to forty gallons of Bordeaux caused burning of the foliage. Using 25 to 30 ounces, however, a very efficient control of the potato beetles was obtained. The yield of potatoes from these plots was also slightly better than from those treated with other sprays and dusts.

ONION

TEST OF VARIETIES.—Although ripening was delayed, owing to cool cloudy weather with heavy precipitation during the latter part of August and the month of September, fairly heavy yields of onions were obtained. Twenty varieties were tested in 1924 and of these, five that have given the best results for the past five years are shown in the following table:—

ONION—TEST OF VARIETIES
Five Years' Average

Variety	Colour	Shape	Yield from two 30-foot rows
			lb. oz.
Extra Early Flat Red	Red	Flat	28 5
Giant Prize Taker	Yellow	Oval	26 12
Red Wethersfield	Red	Slightly oval	24 9
Ailsa Craig	Yellow	Oval	24 3
Yellow Globe Danvers	Yellow	Oval	22 6

Although Extra Early Flat Red has given the highest yield for the past five years, it is in some ways not as desirable a variety as Red Wethersfield. The latter variety is better shaped and keeps longer. It is also more generally known and can be more readily disposed of. Of the yellow varieties, Giant Prize Taker is quite satisfactory.

White Barletta and White Portugal are two of the varieties tested in 1924 that are very suitable for pickling.

TRANSPLANTING ONION.—Seed of the Giant Prize Taker and Red Wethersfield was started in the hotbed on April 1. The plants were pricked out when about 2 inches high and transplanted to the field on May 10. Onions of excellent size for bunching were available on August 1, from both varieties, and the crop was fully matured by September 2. The yield of mature onions from two 30-foot rows was: Red Wethersfield 29 pounds, and Giant Prize Taker 31 pounds.

GARDEN CARROT

TEST OF VARIETIES.—Although several varieties were tried for the first time in 1924, as well as those found most satisfactory in former tests, the most desirable variety was the Ottawa selection of Chantenay. As a second choice Nantes Half Long is quite satisfactory.

DIFFERENT DATES OF SEEDING.—For the past two seasons seed of the Chantenay variety has been sown on several different dates, beginning as early in the season as possible and continuing at intervals of ten days until the first of July. In each season carrots of bunching size have been obtained from seedings as late as June 18.

GARDEN BEET

TEST OF VARIETIES.—Twelve varieties and strains of garden beets were tested in 1924. These included several that were tested for the first time, but, so far, the most suitable varieties tried are Crosby Egyptian and Detroit Dark Red. Of the latter variety the Ottawa selection is much more desirable than the ordinary commercial strain.

DIFFERENT DATES OF SEEDING.—With the object of obtaining information as to just how late in the season garden beet seed may be sown and a crop produced, an experiment was begun in 1923. Seed of Detroit Dark Red has been sown as early in the season as practical and further seedings made at intervals of ten days until the middle of July. In 1923, beets of bunching size were obtained from all seedings up to June 28, and in 1924, up to the seeding made on June 25.

PARSLEY

Three varieties were grown in 1924. Moss Curled, Triple Curled, and XXX. All were ready for use at about the same time and there seemed to be little to choose between them, although Moss Curled produced the largest leaves and XXX the most tightly curled and best appearing parsley.

EGG-PLANT

Only one variety of egg-plant was tried, "Violette de Tokio," but the plants were frozen before eggs were produced. So far the egg-plant has not done well at Lennoxville for even when the seed is started in the hotbed as early as April 1, the season usually proves too short and the early September frosts kill the plants before the crop matures.

PEPPER

Six varieties of peppers were tried in 1924, but, owing to the cool, damp weather during August and the early part of September, only partial crops were obtained. Of the large peppers, Neapolitan and Harris Early produced the best crop, while of the small sorts Long Red Cayenne was the heaviest yielding.

ASPARAGUS

Washington, which is the only variety grown at this Station, has continued to give excellent results and seems well suited to the district. In 1923 the yield was approximately 1,600 bunches to the acre from a plot of three-year-old plants. In 1924 this same plot produced a crop of 2,150 bunches per acre.

When once established, asparagus is easily grown and will apparently produce good crops in this district. Furthermore, bunched asparagus is easily sold and usually commands a good price.

GARDEN PEA

The season at Lennoxville is apparently ideal for garden peas. Excessive heat is not common and prolonged droughts are exceedingly rare. As a result peas produce vigorous vines and continue bearing for a long period.

TEST OF VARIETIES.—The variety test for 1924 included thirty-two strains and varieties, eleven of which were tested for the first time. Several of these gave excellent results, the highest yielding being a strain labelled Seeding No. 1, received from the Dominion Experimental Station, Invermere, B.C. It is a vigorous growing sort and produces a strong vine four to five feet high. Its yield for the season of 1924 was 29 pounds of unshelled peas from one 30-foot row. Another excellent variety that has been tested for the past two years is Lincoln. This variety was also received from Invermere.

Of the readily obtainable commercial varieties, those that have given the best results, for the past seven years, are shown in the following table:—

GARDEN PEA
Average of Seven Years

Variety	Season	Average height	Yield of unshelled peas from one thirty-foot row
		ft. in.	lb. oz.
Telephone	Late	6 1	17 12
Thomas Laxton	Early	3 8	16 4
Gradus	Early	3 7	16 2
Sutton Excelsior	Mid-season	1 6	15 8
Stratagem	Late	3 ..	15 5
American Wonder	Early	1 4	11 10

DISTANCE APART OF PLANTING SEED IN THE ROW.—The usual distance at which peas are spaced in the row when planted at this Station, is one half inch. This practice, however, has not been proven as the most satisfactory by experiments but was, during the past, determined entirely by observation of the crop from one year to another. In order, therefore, to obtain authentic information on the subject, a project was begun in 1923, and has thus far been productive of quite clear results. Following are the average results of the past two seasons.

PEAS—DISTANCE APART OF PLANTING SEED IN THE ROW
Average of Results, 1923 and 1924

Distance apart of planting seed in row	Yield from one thirty-foot row		
	English Wonder	Thomas Laxton	Stratagem
	lb. oz.	lb. oz.	lb. oz.
½ inch	16 ..	16 7	19 9
1 inch	14 ..	11 10	15 12
2 inches	12 ..	11 ..	13 12
3 inches	8 13	9 13	7 ..

BREEDING WORK.—The seed raised from five plants selected from the Gradus variety in 1922 was multiplied in 1923 to a quantity sufficient to plant two 30-foot rows of each in 1924. Although each strain gave a better yield than the ordinary commercial seed of the variety, one in particular was decidedly outstanding as it produced a crop of 42 pounds of unshelled peas from one 30-foot row. This is the best yield of peas ever recorded at this Station. The strains will be multiplied next season.

Breeding work is also being conducted with the Telephone, American Wonder and Stratagem varieties.

PUMPKIN

The season was very favourable for pumpkins and splendid yields were obtained from each of the eight varieties tested. So far the most satisfactory large pumpkin that has been tried is Connecticut Field. The pumpkins are oval in shape and a rich golden yellow in colour. Average specimens will usually weigh from twenty to thirty pounds. Of the small varieties Quaker Pie is very satisfactory although an Ottawa selection of Sweet or Sugar produced larger yields in 1924.

CUCUMBER

Eleven varieties of cucumber were tested in 1924, and of these, the best main crop variety proved to be Davis Perfect, which, from four hills of four plants each, produced a crop of one hundred and six cucumbers weighing fifty-two pounds. Early Russian, the next highest yielding variety, gave a crop of ninety-six cucumbers weighing forty-three and one-half pounds. West Indian Gherkin has proven the most satisfactory for pickling.

SQUASH

Of the seven varieties of squash that were tried in 1924, the best varieties were Golden and Green Hubbard. New Acorn, a variety which is more or less of a novelty as the squash are small and resemble an acorn in shape, produced a crop of excellent quality.

CITRON

Green Seeded produced the largest crop which was also of excellent quality. The other varieties tested were Red Seeded and Colorado.

MUSK MELON

Twelve varieties of musk melon were included in the test for 1924. Seed of each variety was started in the hotbed on April 20 and the plants were transplanted to cold frames on May 28. The frames were kept covered at night and during cool days until July 10. On the whole the crop was quite satisfactory and excellent melons were produced. The most satisfactory large variety was Milwaukee Market. Montreal Market, a very popular variety, gave a larger yield but was of inferior quality. Emerald Gem proved the most desirable of the small varieties.

CABBAGE

TEST OF VARIETIES.—Although a variety test with cabbage has been conducted at this Station for the past ten years, the work was partially reorganized in 1923, when a number of the less productive varieties were dropped from the test while others were included. Therefore, in order that varieties tested for the first time in 1923 may be compared with the best yielding varieties of former years, the following table gives only the average results of the past two seasons:—

CABBAGE, TEST OF VARIETIES

Averages of Results 1923 and 1924

Variety	Date when ready for use	Average weight per single cabbage		Total yield from two thirty-foot rows	
		lb.	oz.	lb.	oz.
Copenhagen Market	July 15	11	10	348	12
Early Paris Market	July 18	9	13	294	6
Early Winnigstadt	July 20	10	4	307	8
Succession	Aug. 1	12	2	363	12
Danish Delicatesse (Red)	Aug. 7	4	15	148	2
Fottler Imp. Brunswick	Aug. 12	12	..	360	..
Summer Ballhead	Aug. 20	7	..	210	..
Solid Emperor Strain	Aug. 24	7	11	230	10
Ex. Amager Danish Ballhead (Ott. Sel.)	Aug. 30	6	13	200	6
Marblehead Mammoth	Sept. 1	14	3	425	10
Enkhuizen Glory	Sept. 2	11	14	356	4
Danish Ballhead Intermediate	Sept. 4	7	10	228	12
Danish Ballhead (short stem)	Sept. 4	7	3	218	10

Of the varieties listed in the foregoing table, the most satisfactory are Copenhagen Market for early use or market, Succession for mid-season, and Enkhuizen Glory, or either of the strains of Danish Ballhead, as a late variety. Danish Ballhead kept longer in storage than any other variety tested at this Station. Marblehead Mammoth, which has produced remarkable yields, splits badly when nearing full development.

DIFFERENT DATES OF SEEDING.—During the past two seasons seed of Copenhagen Market and Danish Ballhead has been sown early in May and from then on at intervals of two weeks until the middle of July. Following are the restults obtained:—

CABBAGE, DIFFERENT DATES OF SEEDING

Seeding	Date when ready for use				Average yield from two thirty-foot rows			
	Copenhagen Market		Danish Ballhead		Copenhagen Market		Danish Ballhead	
	1923	1924	1923	1924				
					lb.	oz.	lb.	oz.
Second week of May	July 15	July 10	Aug. 22	Aug. 19	300	8	207	..
Third week of May	July 22	July 23	Aug. 28	Aug. 27	275	8	210	12
First week of June	Aug. 1	July 30	Sept. 7	Sept. 10	239	12	182	..
Third week of June	Aug. 12	Aug. 14	Sept. 30	Oct. 5	225	12	135	..
First week of July	Sept. 6	Sept. 9	No crop		180	..	...	..
Third week of July	Sept. 30	Oct. 3	No crop		150	..	...	..

SWEET CORN

Apparently it is becoming increasingly difficult to raise sweet corn at Lennoxville. During the past three years thirty-one varieties have been tested but only the very earliest have produced satisfactory crops. Of these, Early Malcolm and Golden Bantam are the most desirable. Pickaninny, a small, dark-coloured variety of excellent flavour, is much earlier than all other varieties tested, but, owing to its small ear, is not as readily saleable as the other varieties.

CAULIFOWER

TEST OF VARIETIES.—Cauliflowers are usually a good crop at this Station and but little trouble is experienced in producing heads of splendid size and quality. Of the two varieties that have been grown for a number of years, Extra Early Dwarf Erfurt is the earliest and the best quality. Early Snowball will usually produce the heaviest crop, but, as a rule, a high percentage of the heads are of inferior quality.

DIFFERENT DATES OF SEEDING.—This project has been conducted for three years and so far it has demonstrated that good marketable heads may be produced from seedings as late in the season as June 14.

TOMATO

TEST OF VARIETIES.—For the first time in three years tomatoes were a normal crop. Thirty varieties and strains were tested and ripe fruit was obtained from each. The highest yielding strain was the Lennoxville Selection of Bonny Best, which produced forty-one and a half pounds of ripe tomatoes from fifteen plants, the first picking being available on August 12. The earliest variety was Alacrity X Earlibell Ottawa No. 3035, which produced the first ripe fruit on August 8. John Baer, a very popular variety in this district, gave a yield of thirty-one and a half pounds, the first ripe tomato making its appearance on August 9.

RADISH

As usual, the season was very favourable for radish and a crop of excellent quality was obtained from each of the thirteen varieties tested. The most satisfactory varieties were French Breakfast, Scarlet Turnip White Tip, and XXX Scarlet Oval.

LETTUCE

TEST OF VARIETIES.—Twenty-three varieties and strains of lettuce were tested during the past season, which proved favourable, and some excellent lettuce was produced. So far the most desirable varieties that have been tested at the Station are:—Loose-leaf, Grand Rapids and Black Seeded Simpson. Cabbage head varieties—Iceberg and Salamander have proven very satisfactory.

BEAN

TEST OF VARIETIES.—Although beans made a very strong growth and produced large yields, the dark cloudy weather favoured the spread of disease and, as a result, pod spot or anthracnose was unusually bad. Of the twenty-four varieties tested, Refugee 1000 to 1, a green podded variety, was the only one that produced perfectly clean pods. Of the yellow-podded varieties, Hodson Long Pod was 93 per cent free from disease. Both varieties yielded well and the crop was of excellent quality.

DISTANCE APART OF PLANTING SEED IN THE ROW.—In each of the past two seasons seed of two varieties, Round Pod Kidney Wax and Stringless Green Pod, has been planted at two, four and six inches apart in the row. Following is the average of results.

BEANS, DISTANCE APART OF PLANTING SEED IN THE ROW
Average of Results 1923 and 1924

Distance apart of beans in the row	Yield from one thirty-foot row			
	Round Pod Kidney Wax		Stringless Green Pod	
	lb.	oz.	lb.	oz.
2 inches	18	12	18	6
4 inches	17	3	17	..
5 inches	15	8	13	..

From the foregoing it will be noted that with each variety the closer planting gave the larger yield. It must, however, be borne in mind that during the past two seasons there has been an abundance of rainfall and, as a result, there was ample moisture available for the larger number of plants, in a given area, with close plantings. In a dry season it is possible that plants growing two inches apart would be unable to obtain sufficient moisture and as a result, produce a poor crop. It was also observed that where the plants were six inches apart, the percentage of pod spot injury was much less than with the closer plantings.

TREE FRUITS

APPLES

VARIETY ORCHARD.—Although steady cold weather prevailed during most of the winter of 1923-24, the lowest temperature recorded was -29°F. which for this section is not unusually severe. As a result the entire apple orchard escaped winter injury and most of the trees began the season of 1924 in a healthy, vigorous condition. Owing to the cool spring, bloom was delayed, but a few warm days in early June opened the buds over the entire orchard. Favourable weather for pollination continued during most of the period of bloom and a good set of fruit resulted. The crop of apples was also late, but was the largest that has been obtained at the Station, one eight-year Melba tree yielding two and a half bushels.

Owing to the extremely low temperatures usually experienced during the winter months, practically all of the so-called hardy standard varieties of apples are subject to severe winter injury at this Station. Accordingly, the only varieties that can be recommended, for this particular district, are those that have proven hardier than the readily obtainable commercial sorts. Fortunately, however, as has been demonstrated during the past eleven years, many of the varieties originated by the Dominion Horticulturist possess the required hardiness and produce fruit of excellent quality. The most satisfactory of these varieties that have been tested at Lennoxville are, in order of their season, Galetta, Melba, Joyce, Horace, Pedro, Lobo and Rocket. Scions and two-year-old trees of these varieties are now available in limited quantities from this Station.

PLUMS

An excellent crop of plums was obtained, although with a few varieties the fruit did not ripen. So far it would seem that the most dependable varieties for the district are Waneta, Kahinta and Hawkeye. Scions of these varieties are available for distribution.

PEARS

Owing to the favourable winter, pear trees escaped winter killing and made excellent growth during the season. Blossoms appeared on several trees but no fruit was obtained. The new growth ripened well and the trees entered the winter of 1924-25 in splendid condition.

SMALL FRUITS

Throughout the Eastern Townships, the growing season is for the most part ideal for small fruits, but owing to the severe winters and the usual changeable weather during early spring, only varieties possessing extreme hardiness are likely to succeed.

STRAWBERRIES

TEST OF VARIETIES.—Since 1917 a total of twenty-nine varieties of strawberries have been tested at Lennoxville and, although many have not proven sufficiently hardy, a fair number have successfully survived the most rigorous winters and unfavourable springs. A five-year average of results of those found most satisfactory is shown in the following table:—

STRAWBERRIES, TEST OF VARIETIES

Average of Five Years

Variety	Average Season	Quarts per acre
Buster (imp)	July 3 to July 30	7,228
Pocomoke (per)	July 1 to July 17	6,888
Stevens Late Champion (per)	July 1 to July 21	6,568
Howard No. 41 (imp)	July 1 to July 20	6,421
Mariana (per)	June 27 to July 18	6,230
Ruby (per)	July 1 to July 21	5,963
Parson Beauty (per)	June 30 to July 31	5,590
Portia (imp)	July 1 to July 31	5,354
Senator Dunlap (per)	June 27 to July 17	5,270
Valeria (per)	June 30 to July 20	5,088

Of the varieties tested in the foregoing table, Parson Beauty, Portia and Senator Dunlap are the only ones that combine good quality and appearance with a firmness sufficient to hold up under shipment. On heavy land, Senator Dunlap will usually yield much better than it has on the sandy site where the tests have been conducted at Lennoxville. For home use both Buster and Pocomoke are very satisfactory.

BREEDING WORK.—In 1922 seed was obtained from the fruit of several standard varieties and planted. The seedlings obtained were transplanted to short rows in 1923 and bore a crop of fruit in 1924. One lot from Wm. Belt seed produced a very large crop of early fruit of fair size and excellent quality. Another lot from Valeria seed gave a late crop of large berries. Both lots will be propagated in 1925.

Successful crosses were made between several varieties in 1924, and the seed obtained planted early in August.

BUSH FRUITS

The new plantation of bush fruits started in 1922 has made excellent progress and produced a fair crop of fruit in 1924. Among the varieties tested for the first time at this Station, the most promising are Newman No. 23 and Latham raspberries. Of the other classes of bush fruits no variety has so far shown a decided superiority over previously recommended sorts. Accordingly, for the present the following varieties are recommended:—

RASPBERRIES.—Newman No. 23, Latham, King.
BLACK CURRANT.—Saunders, Kerry and Climax.
RED CURRANT.—Red Grape and Victoria.
WHITE CURRANT.—White Cherry.
GOOSEBERRIES.—Houghton, Carrie, Downing.

Breeding Work with Blackberries.—With a view towards producing a variety of blackberries of good quality and sufficiently hardy for the district, a breeding project was begun in 1922. Crosses have been made, on selected plants of the wild species, with pollen from the best of the cultural sorts and the Columbian raspberry, and, in each case, seedlings have been raised from the seed thus obtained. So far, none of these has produced fruit but all were in a vigorous condition at the close of the past season and many should fruit in 1925.

In collecting native wild plants for crossing, a few very desirable types were found. These fruited in 1924 and one in particular seems well suited to growing under cultivation. It is being propagated.

ORNAMENTAL GARDENING

Although slow in getting established, and repeatedly checked by severe weather and occasional flooding by the St. Francis river, the ornamental section at the Station is becoming more attractive and pleasing each season. The perennial border at the south end of the area was exceptionally satisfactory in 1924. From the first appearance of polyanthus and pansy bloom, early in May, there was a continuous display of bloom until the late perennial phlox was completely submerged, over a period of thirty hours, through flooding on September 10 and 11. The various species survived this immersion with little or no injury, other than the destruction of bloom, and entered the winter in excellent condition. The shrubbery border which forms the western boundary of the lawn, has been twice broken down with ice, yet new growth has rapidly filled in the breaks, and each season it is becoming more attractive.

Hydrangea paniculata, var. grandiflora. One of the best flowering shrubs at Lennoxville.

Roses.—Fifty rose bushes, representing eleven varieties of the hybrid tea group and fourteen hybrid perpetuals, were obtained from England early in February, 1923, and planted on April 25. All came through the winter of 1923-24 without injury and produced a fair quantity of splendid bloom. The most attractive varieties in each group were as follows:—

Hybrid tea

Variety	Colour	Duration of bloom
Ophelia	Salmon rose	July 10 to late October
Lady Ashton	Pale rose	June 29 " "
Edward Mawley	Deep crimson	July 12 " "
J. B. Clark	Scarlet	July 5 " "

Hybrid perpetual

Variety	Colour	Duration of bloom
Frau Karl Druschki	White	July 18 to late October
Captain Hayward	Crimson	July 8 " "
Fisher Holmes	Deep maroon	July 10 " "
Mrs. James Laing	Pink	July 19 " "

DUTCH BULBS.—Tulips and narcissi wintered well and the bloom was very satisfactory. One large oval bed containing 600 Darwin tulips, produced the finest floral display of the season. All varieties in this bed began to bloom early in June, and continued in bloom for about three weeks, many of the individual flowers being four inches across and the plants averaging from two to two and one-half feet in height. In general the varieties of bulbs recommended in previous reports were found most satisfactory.

ANNUAL FLOWERS.—The usual number of varieties of annual flowers were tested and the previously recommended varieties were found perfectly satisfactory. Owing to the rather cool season, outdoor seedings were not as satisfactory as usual. Twenty-four varieties of gladioli were added to the variety experiments with this species last season. Several proved distinctly superior to those previously tested. These are as follows: Purple Glory, Rose Glory, Pink Wonder, White Wonder, Kunderd's Marshall Foch and Mary Pickford.

CEREALS

The obtaining of feed concentrates, at a price that will render possible the commercial feeding of live stock, is one of the chief problems confronting Eastern Townships farmers. Usually each farmer raises sufficient oats to feed the horses on his farm and provide next season's seed supply, but the bulk of feed concentrates required by other classes of farm animals is, as a rule, supplied at a high price by the local feed merchant. Such a practice is obviously expensive and must be combined with very careful management, and the possession of excellent stock, in order that a profit may be realized. Even under these very rare conditions it is becoming increasingly difficult to secure a profit from live stock owing to the decided upward trend in feed prices. If more grain were produced at home, even at a cost equal to the purchased material, it is quite obvious that a distinct stablizing element would thus be introduced into farm finance. A considerable portion of each year's feed supply would thereby remain at a constant price throughout the season, and the purchase of feed would be from the land instead of the feed merchant.

The general impression among farmers is, that, owing to climatic peculiarities, this district is not entirely suitable for grain growing. However, from the experience gained thus far at this Station from experiments with cereals, it would seem that a great deal of the difficulty is caused by the use of poor or unsuitable varieties. The general adoption of recommended varieties of barley and oats, and the more general use of barley, would substantially increase the production of grain throughout the district.

VARIETY TESTS OF CEREALS

The tests of cereal varieties for the season of 1924 were conducted in two stages. First, a large number of varieties were tested in quadruplicate plots, each composed of one row a rod long. The object of this work was to determine, with the least possible expense, which varieties, of the large number available, should be included in the main test. In the main test the plots are one-hundredth acre in area and each variety is tested in duplicate. The material in the following report is compiled from the results from the larger plots.

OATS

Following are the results of varieties of oats that have been tested for two years:—

AVERAGE OF RESULTS FOR 1923 AND 1924

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre		
		inches		bush.	lb.	lb.
Banner, Lennoxville	102·5	57·5	6·9	91	33	3,127
Longfellow, Ottawa 478	101·0	52·5	9·7	82	14	2,800
Legacy, Ottawa 678	98·5	48·0	9·7	82	6	2,790
Banner, Macdonald College 44	100·0	54·0	8·2	76	6	2,590
Daubeny, Ottawa 47	92·0	42·5	9·0	75	30	2,580
Victory	105·5	47·0	7·0	75	15	2,497
Banner, Ottawa 49	103·5	56·0	9·0	73	10	2,492
O.A.C. 72	105·0	56·5	9·7	71	3	2,417
Gold Rain	101·5	56·5	6·2	69	26	2,372
Alaska, Macdonald College 712	90·5	51·0	9·0	54	26	1,862
Alaska	90·5	45·5	8·7	52	14	1,782
Liberty, Ottawa 480	105·5	45·5	9·7	42	19	1,447

The varieties listed in the table, even on a two-year average, show a greater variation of yield than is desirable among commonly-used sorts. For instance, Alaska, which is grown quite extensively throughout this section, has not yielded as well as Daubeny Ottawa 47, the only other early oat included in the test. It is also quite apparent that decided improvements, in so far as this particular district is concerned, are quite possible with the Banner variety. In proof of this assertion the performance of the Lennoxville selection of Banner is noteworthy, as this was obtained merely by selecting outstanding heads from a field crop of Banner, grown from registered seed, at this Station in 1922.

Although tested but two years, both Longfellow, Ottawa 478, and Legacy, Ottawa 678, show very desirable characters. Both varieties are comparatively short-strawed and stand up well. This was particularly noticeable during the season of 1924, when several heavy rains occurred while the grain was ripening. Storms that laid other varieties quite flat did not affect Longfellow and Legacy to any noticeable extent, and aside from a few broken straws, the plots were in fine condition when harvested. On low-lying or very fertile land, where Banner is likely to lodge, either of these varieties should prove very satisfactory.

COMPARISONS OF STRAINS OF BANNER.—Five strains of the Banner variety were included in the 1924 tests and, although these are commonly known as representing one variety, the difference in general character and yielding ability was greater than is frequently met with in distinct varieties.

Following is a condensed statement of the results obtained:—

COMPARISON OF STRAINS OF BANNER

Strain	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre		
		in.		bush.	lb.	lb.
Banner, Lennoxville	105	46	8	95	20	3,250
Banner, Alberta	109	38	6	77	32	2,650
Banner, Ste. Rosalie	105	46	4	75	10	2,650
Banner, Ottawa 49	107	43	7	70	20	2,400
Banner, Macdonald College 44	100	40	10	70	..	2,380

BARLEY

Under good cultural conditions, barley is normally a higher-yielding crop at Lennoxville than oats. It is also of higher feeding value, since the grain contains a lower percentage of hull. In order to reach the maximum in grain production per acre in nearly any part of the Eastern Townships, it is practically essential that barley be included as a common farm crop. This, however, is rarely the case, for aside from a very light mixture of barley with oats but little of this high-yielding crop is grown. Following is a two-year average of the best varieties of barley tested at this Station:—

BARLEY—AVERAGE OF RESULTS 1923 AND 1924

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre		
		in.		bush.	lb.	lb.
Charlottetown 80	92·5	43·0	10·0	76	2	3,650
Chinese, Ottawa 60	97·0	48·5	9·9	68	18	3,282
O.A.C. 21	91·0	48·0	9·7	67	19	3,225
Mensury, Macdonald College 3207	92·0	42·5	9·9	65	40	3,160
Duckbill, Ottawa 57	99·0	46·0	10·0	61	47	2,975
Himalayan, Ottawa (Hulless) 59	86·0	30·0	9·4	60	13	2,893

Of the above varieties, Chinese, Ottawa 60, O.A.C. 21, and Mensury are six-rowed, and very similar in all respects. Duckbill and Charlottetown are two-rowed and Himalayan is hulless. With regard to Himalayan it is the earliest variety thus far tested at Lennoxville and, when the percentage of hull found on the other varieties is taken into consideration, it yields about as well as most of those tested. In the trials conducted in 1924 it ranked fourth out of nine varieties in total pounds of grain per acre regardless of hull. It would seem, therefore, that this variety could be grown to advantage quite generally. Of the other varieties, Charlottetown 80, as a two-rowed sort, and Chinese, Ottawa 60, as a six-rowed variety, are very desirable.

SPRING WHEAT

AVERAGE OF RESULTS 1923 AND 1924

Variety	Number of days maturing	Height	Strength of straw on scale of 10 points	Yield per acre		
		in.		bush.	lb.	lb.
Huron, Ottawa 3	114·0	47·5	10	35	42	2,142
Early Red Fife, Ottawa 16	112·5	44·0	10	30	52	1,852
Charlottetown 123	109·5	46·5	10	28	38	1,718
Pringles Champlain, Macdonald College 307	114·0	46·5	10	28	38	1,718
Ruby, Ottawa 623	107·0	45·5	10	26	8	1,568
Marquis, Ottawa 15	112·5	41·5	10	22	23	1,342

Huron wheat, as may be noted, has given the best yield of the varieties tested, and although it is not quite as good a milling wheat as Early Red Fife, the flour being a little dark, the difference as determined at the Central Experimental Farm, Ottawa, is slight. On the other hand, the yield is higher and until better varieties are available, Huron is decidedly the variety for the district.

FALL WHEAT

Six varieties and strains of fall wheat were sown on September 12, 1923. The land used for the experiment was a light loam underlaid with gravel. It had been seeded down to clover the previous season and produced a fair crop of hay in 1923. Immediately after haying it was ploughed, manured at the rate of 16 tons of barnyard manure per acre, and well worked with the disk and drag harrows.

Each variety was sown in duplicate hundredth-acre plots, one plot of each being sown on the flat and the other in the hollows between shallow drills, seven inches apart. It was thought that the drills would arrest the drifting snow and thus insure a more complete covering for the young plants and consequently better wintering. The resulting effect was, however, more detrimental than otherwise, for in the late spring the snow held in the hollows turned to ice which, by alternately softening and freezing solidly, practically killed out the entire stand. Following are the results from the plots sown on the flat:—

FALL WHEAT, 1924

Variety	Date of ripening	Per cent stand	Height	Strength of straw on scale of 10 points	Yield per acre	
			in.		bush. lb.	lb.
Karkov, Macdonald College 1312	Aug. 2	75	39	10	45 50	2,750
Kanred	July 30	70	38	8	45 ..	2,700
Dawson's Golden Chaff	July 30	70	46	10	38 45	2,325
Karkov, Macdonald College 112	July 30	76	39	10	35 50	2,150
O.A.C. 104	July 31	70	49	9	27 30	1,650
Karkov, Macdonald College 22	Aug. 1	74	38	10	26 40	1,600

It may be noted from the above table that in no case did a variety compose a full or normal stand; nevertheless, the yield from Karkov, Macdonald College 1312, was much higher than may be expected from spring wheat grown under equal cultural conditions. The light stand was of course the result of partial winter killing as all plots entered the winter with a full stand. Should it prove possible to develop varieties whose hardiness could be relied upon, and that would yield as well as the best of those tested in 1924, there is little doubt but that fall wheat would become an important crop in this district.

FALL RYE

Two varieties of fall rye, Dakold and Common, were sown in duplicate plots on September 12, 1923. The land was adjacent to and prepared the same as that for fall wheat. Both varieties wintered well and made a very strong growth in 1924. Dakold was ready for harvesting on July 28, and produced a crop of 1,950 pounds of grain per acre. Common proved to be three days later and was harvested on July 31, yielding 2,050 pounds per acre.

Fall rye is a crop that could be more commonly used throughout the Eastern Townships.

FIELD BEANS

FIELD BEANS—AVERAGE OF RESULTS 1923 AND 1924

Variety	Number of days maturing	Height of plant	Yield per acre	
		in.	bush.	lb.
Navy, Ottawa 711	101·5	18	42	48
Selected White, Lennoxville	110·0	18	34	16
Yellow Six Weeks	107·5	17	34	19
Norwegian, Ottawa 710	111·0	18	30	50
Large White, Ottawa 713	104·5	17	23	57
Beauty, Ottawa 712	102·5	15	19	16
Soldier	108·0	19	18	37

The yields, as tabulated in the foregoing table, may be considered as unusually high for field beans. However, since variety tests of beans have been conducted at this Station for only two years, such yields should not be considered as normal for the district, until substantiated by results from several additional seasons.

With regard to the varieties tested, Navy, Ottawa No. 711, Selected White, Lennoxville and Large White, Ottawa No. 713, are average-sized white beans of good quality. Yellow Six Weeks is medium in size and light yellowish brown in colour. Norwegian, Ottawa No. 710, is slightly larger in size than Yellow Six Weeks and of a light brown colour. Beauty is a small bean and very light yellow in colour, with a small darker spot. The common Soldier bean needs no description.

FIELD PEAS, 1924

TEST OF VARIETIES

Variety	Date of planting	Number of days maturing	Length of vine	Yield per acre	
			in.	bush.	lb.
Arthur, Ottawa 18	May 12	102	46	39	47
Champlain, Ottawa 32	" 12	104	48	39	35
Cartier, Ottawa 19	" 12	100	46	38	20
Chancellor, Ottawa 26	" 12	103	61	36	40
McKay, Ottawa 25	" 12	111	54	35	50
Golden Vine	" 12	106	50	30	..

Of the above varieties, Arthur would seem the best for sowing alone or along with other grains for mixed grain. Chancellor is a very small hard pea and is splendid for cooking. It also produces a very long, strong-growing vine and should prove very satisfactory for mixing with oats and vetches to form the O.P.V. forage mixture.

MIXED GRAIN

Under average conditions mixed grain frequently will give a heavier crop than either wheat, barley or oats when sown alone. Furthermore, mixed grain which contains a fairly high percentage of wheat, or barley, or both, is a better feed, pound for pound than oats. Accordingly, it would appear that a fairly large proportion of the farm grain area often may be sown to mixed grain to advantage in this district. In order to determine the best varieties to grow together for mixed grain a project was begun in 1924. Following are the results obtained:—

MIXED GRAIN, 1924

Variety and rate per acre	Date of sowing	Date of ripening	Number of days maturing	Average length of straw including head	Average yield of grain per acre	Remarks
lb.					lb.	
Duckbill, Ott. 57.....Barley 48 Banner, Lennox.....Oat 68	May 10	Aug. 25	101	Barley 38 Oat 46	3,500	Ripe together.
Charlottetown 80.....Barley 48 Banner, Ottawa 49.....Oat 68	May 10	Aug. 24	100	Barley 36 Oat 46	3,450	Barley 3 days ahead of oats.
Charlottetown 80.....Barley 48 O. A. C. 72.....Oat 68	May 10	Aug. 25	101	Barley 36 Oat 48	3,150	Ripe together.
Colorado Bearded.....Wheat 30 Duckbill, Ott. 57.....Barley 36 Banner, Lennox.....Oat 51	May 10	Aug. 25	101	Wheat 44 Barley 40 Oat 46	3,100	Ripe together.
Colorado Bearded.....Wheat 30 Duckbill, Ott. 57.....Barley 36 Banner, Ottawa 49.....Oat 51	May 10	Aug. 25	101	Wheat 46 Barley 38 Oat 46	3,050	Ripe together.
Duckbill, Ott. 57.....Barley 48 O. A. C. 72.....Oat 68	May 10	Aug. 25	101	Barley 38 Oat 48	3,050	Ripe together.
Chinese, Ott. 60.....Barley 48 Banner, Ottawa 49.....Oat 68	May 10	Aug. 24	100	Barley 46 Oat 46	3,000	Barley ripened 10 days before oats.
Colorado Bearded.....Wheat 30 Charlottetown 80.....Barley 36 Banner, Ottawa 49.....Oat 51	May 10	Aug. 23	99	Wheat 44 Barley 36 Oat 46	2,950	Ripe together.
Ruby, Ottawa 623.....Wheat 35 Charlottetown 80.....Barley 36 Banner, Ottawa 49.....Oat 51	May 10	Aug. 24	100	Wheat 44 Barley 34 Oat 46	2,650	Ripe together.
Chinese, Ottawa 60.....Barley 48 Alaska.....Oat 68	May 10	Aug. 14	90	Barley 46 Oat 46	2,350	Ripe together.
O. A. C. 21.....Barley 48 Alaska.....Oat 68	May 10	Aug. 14	90	Barley 46 Oat 46	2,350	Ripe together.

The highest yield was obtained from a mixture of two bushels of Banner oats, Lennoxville selection, and one bushel of Duckbill Ottawa 57 barley. This mixture ripened well together and the slight difference in height of the two sorts was insufficient to cause trouble in harvesting. Although definite conclusions cannot be drawn from the results of a single season, the yields of the mixture would indicate that the best yields of grain are possible with a mixture of Banner oat and a late two-rowed barley. Where a grain of higher feeding value is required, good results should be obtained by the addition to the mixture of a heavy yielding early wheat, such as Colorado Bearded.

AVERAGE YIELDS OF GRAIN, 1924

Grain	Number of varieties or mixtures tested	Average yield per acre
		lb.
Barley	8	2,875
Mixed grain	11	2,873
Fall wheat	6	2,229
Peas	6	2,202
Oats	16	2,190
Fall rye	2	2,000
Spring wheat	8	1,911

The above results, as indicated by the heading, include the average yields of the various varieties, of each class of grain, that were tested in 1924. The entire area on which the crops were grown was practically uniform throughout in character of soil and fertility, and all of the spring-sown grains received the same cultivation. The land for fall wheat and rye was worked up and sown, of course, the previous season. Under such conditions, therefore, it is interesting to note the relative standing of the different kinds of grain in actual pounds per acre. Also, had it been possible to work out yields from a standpoint of digest ble nutrients, it is quite obvious that barley, mixed grain, fall wheat and peas would have shown an even greater superiority over oats as they are decidedly higher in feeding value.

FORAGE CROPS

The economical production of feed roughages, or forage crops, is of vital importance to farmers of the Eastern Townships, for, under the present system of farming, they are the main crops produced on the average farm. An important factor in economical production is the choice of variety. It is conceivable that even with ideal soil fertility, correct cultural methods, favourable seasonal conditions and entire freedom from insect or disease injury, a crop failure may result from the use of an unsuitable variety.

The work with forage crops at this Station is confined largely to the testing of varieties. All varieties are grown in duplicate, triplicate or quadruplicate plots, and the yields reduced to a dry weight basis and averaged. Furthermore, to eliminate error from uncontrollable causes, all yields are calculated to a full stand.

ENSILAGE CORN

Although nineteen varieties of ensilage corn were tested in 1924, only twelve of this number were included in the 1923 tests. Accordingly, since even a two-year average is more reliable than the results from a single season, only varieties that have been tested for two years are included in the following table:

ENSILAGE CORN—AVERAGE OF RESULTS, 1923 and 1924

Variety	Source	Stage of maturity	Height		Yield per acre			
					Green		Air-dry	
			ft.	in.	tons	lb.	tons	lb.
Compton's Early	Duke	Milk	7	7·0	22	375	3	1,955
Leaming	Parks	Kernel formed	8	4·5	20	1,775	3	1,799
Northwestern Dent	Macdonald College	Late dough	8	3·0	17	1,100	3	1,660
Golden Glow	Duke	Kernel formed	8	6·0	20	725	3	1,556
Twichell's Pride	Experimental Station, Fredericton.	Late dough	5	6·0	15	1,575	3	1,292
Wisconsin No. 7	Parks	Kernel formed	9	-	23	750	3	1,253
Longfellow	Duke	Late milk	8	3·0	20	50	3	960
North Dakota	Steel-Briggs	Early dough	7	5·0	17	1,015	3	440
Leaming	Duke	Kernel formed	8	4·0	18	1,875	3	237
Quebec No. 28	Macdonald College	Late dough	6	3·0	15	1,400	3	190
White Cap Yellow Dent	Steel-Briggs	Kernel formed	7	9·0	17	15	3	37
Northwestern Dent	McKenzie	Early dough	6	8·0	14	1,575	3	37

Previous to 1923, although twenty-nine varieties of corn had been tested, dry weight determinations were not made and, as a result, the yields are not comparable with the past two seasons. It is worthy of note, however, that in the seven-year average of yields from 1916 to 1922 inclusive, Compton's Early is the outstanding variety on a green weight basis. Also for the past two seasons, when dry weight determinations were made, it produced the highest

yield of dry material per acre. Accordingly, for the present at least, this Station recommends Compton's Early as an ensilage variety for the eastern portion of the Eastern Townships. For the western counties of the district better success will no doubt be obtained with the stronger growing varieties, such as Leaming or Golden Glow.

SUNFLOWERS

SUNFLOWERS—AVERAGE OF RESULTS, 1923 AND 1924

Variety	Source	Height		Maturity	Yield per acre			
					Green		Air-dry	
		ft.	in.		tons	lb.	tons.	lb.
Mammoth Russian	Kenneth McDonald	7	3	26% bloom	24	425	3	1,916
Mammoth Russian	From local seedsmen	8	1	25% bloom	23	650	3	1,062
Russian Giant	Dakota Imp. Seed Co.	7	10	20% bloom	20	1,050	3	953
Manceta	C.P.R.	6	1	25% ripe	16	1,700	2	1,310
Black Seeded	C.P.R.	6	2	Beginning to ripen.	18	400	2	1,031
Manchurian	A. E. McKenzie	5	3	25% ripe	15	400	2	666
Mixed strains	C.P.R.	6	5	95% bloom	15	1,925	2	660
Ottawa 76	Experimental Farm, Ottawa.	6	–	Full bloom	16	625	2	613
Mammoth	C.P.R.	6	8	75% bloom	18	55	2	315

Sunflowers, yielding 18 tons per acre.

Owing to the increasing prevalence of the "Peacock Fly," sunflowers have not produced a normal crop at this Station since 1922. Accordingly, variety tests with this crop, instead of being a comparison of the productive characters of the various varieties, have been more in the nature of a test of resistance to, or avoidance of, the attack of this insect. From observations made during the past two seasons, it would seem that either a very early or a very late variety

will partially succeed where the peacock fly is common. The greatest damage seems to be accomplished just as the plant is beginning to mature, that is, when vegetative growth has practically ceased and the tissue of the stem is still soft and tender. While the plant is in a strong condition, just before bloom, the presence of larvae seems to do very little harm. Also when the ripening process is well underway, the stem tissue is tough and dry and, as a consequence, the larvae make but little headway. Fortunately the peacock fly —seems to be fairly regular in its appearance and, as a result, a very early maturing or a very late variety will partially avoid its attack and thus escape serious injury.

SWEDE TURNIPS

Swede turnips are one of the most dependable crops grown in the Eastern Townships. Hay, grain, corn and other root crops usually produce fair yields but are subject to rather wide variations in yield in different seasons, with occasional partial crop failure. Swede turnips, however, if grown under proper cultural conditions nearly always produce good yields. Owing to the manual labour necessary for their production, and the introduction of the silo, the acreage of this crop is much smaller than it was fifteen years ago, but during the past two or three years, fields of swede turnips are again becoming plentiful.

During the past two years one hundred and twenty-three lots of Swede turnip seed have been tested. These represent practically all of the varieties obtainable commercially, as well as a number of the common varieties obtained from several sources. Following is a two-year average of results of the outstanding varieties obtained from Canadian seedsmen:—

SWEDE TURNIPS—AVERAGE OF RESULTS, 1923 AND 1924

Variety	Source	Yield per acre				Average type and colour	Percentage true to type
		Green		Air-dry			
		tons	lb.	tons	lb.		
Ditmars	H. H. McNutt	30	50	3	637	Bronze top, globe	71·40
Magnum Bonum	Ewing	24	1,227	3	631	Purple top, globe	66·24
White Swede	Bruce	30	1,335	3	404	Bronze top, globe	65·88
Garton's Superlative	Ewing	30	1,765	3	254	Purple top, globe	64·19
Hall's Westbury	Ewing	32	590	3	202	Purple top, globe	72·59
Canadian Gem	Bruce	24	850	2	1,682	Purple top, globe	72·74
Bruce's Giant Purple Top	Bruce	24	1,247	2	1,615	Purple top, globe	
Elephant	Bruce	23	1,535	2	1,308	Purple top, oval	54·67
Bangholm	Ewing	21	450	2	1,303	Purple top, globe	56·87
Halewood's Green Top	Ewing	22	235	2	1,183	Bronze top, oval	57·59
Hartley's Bronze Top	Bruce	20	1,460	2	1,079	Bronze top, globe	61·92
Sutton's Champion	Ewing	20	325	2	1,023	Purple top, globe	80·54
Mammoth Clyde	Ewing	25	1,302	2	985	Purple top, globe	59·84
Universal	Ewing	26	437	2	878	Purple top, globe	66·13
Magnum Bonum	Bruce	25	612	2	790	Purple top, globe	69·12
Derby Green Top	Bruce	22	922	2	764	Bronze top, globe	67·57
Kangaroo	Ewing	22	250	2	745	Bronze top, oval	46·42
Invicta	Ewing	23	1,181	2	223	Purple top, globe	64·69

MANGELS

During the past two seasons, forty-two varieties and strains of mangels have been tested at this Station. The object of this work has been not only to compare the actual value of varieties as represented by their yielding ability, but also to determine their trueness to type, general characters and correctness of naming. For this purpose, seed of a number of the most common varieties was obtained from each of several sources. The resulting crops were observed throughout the season and at harvest the average type and trueness to that

particular type was determined. Following is a statement of the results obtained from some of the most popular varieties obtained from various sources throughout Canada:—

MANGELS—AVERAGE OF RESULTS, 1923 AND 1924

Variety	Source	Average type	Percentage true to type	Yield per acre	
				Green	Air-dry
				tons lb.	tons lb.
Danish Sludstrup	Kenneth	Yellow intermediate	80·5	36 1,675	4 999
Yellow Intermediate	Exp. Farm, Ottawa.	Orange intermediate	91·1	30 1,860	4 411
Giant White Feeding	Bruce	White	58·2	30 1,375	3 1,145
Mammoth Red Intermediate.	Bruce	Red, oval	66·7	38 1,875	3 1,089
Selected Rose Intermediate.	Ewing	Rose pink, intermediate	83·1	23 1,250	3 1,024
Giant Yellow Intermediate.	Bruce	Orange, intermediate	69·3	24 1,800	3 353
Danish Sludstrup	Ewing	Orange, intermediate	67·1	26 575	3 104
Gate Post	Bruce	Red, long	90·4	25 575	3 76
Red Globe	Ewing	Red, globe	90·6	26 1,875	3 36
Red Globe	Bruce	Red, globe	89·9	26 150	2 1,978
Large Yellow Globe	Bruce	Yellow, globe	76·3	28 800	2 1,777
Giant Rose Sugar	Bruce	Rose pink, intermediate	78·5	25 925	2 1,643
Golden Tankard	Bruce	Orange, oval	62·8	21 1,000	2 1,351
Golden Fleshed Tankard.	Steele-Briggs	Deep orange, oval	75·8	13 1,775	2 728
Giant Yellow Globe	Ewing	Yellow, globe	79·7	20 1,200	2 507
Golden Tankard	Ewing	Deep orange, oval	75·3	18 1,750	2 503
Long Red Mammoth	Ewing	Red, long	89·3	18 1,550	2 486
Giant Yellow Intermediate.	Ewing	Orange, intermediate	65·2	20 875	2 462

As has been stated in previous reports, the greatest uniformity and the highest yield are usually obtained with varieties of the orange or yellow intermediate type. From the accompanying table it will be noted that the two leading varieties on a basis of dry material per acre are a yellow and an orange intermediate. Furthermore, these varieties are reasonably true to type, and, as a result, contain but few inferior impurities Generally speaking, varieties of this type will be found most satisfactory throughout the district.

FIELD CARROTS

Seventeen lots of field carrots were tested in 1924. These represented practically all of the common commercial varieties supplied by different seedsmen. Of the lots tested eleven were also tested in 1923. Accordingly, since averages are more dependable than the results of a single season, the following table is made up from the average results of such varieties or strains that have been tested for two years.

FIELD CARROTS—AVERAGE OF RESULTS, 1923 AND 1924

Variety	Source	Average type and colour	Per cent true to type	Yield per acre	
				Green	Air-dry
				tons lb.	tons lb.
Mammoth Intermediate	Bruce	White, intermediate	92·0	25 725	2 1,201
White Belgian	Bruce	White, long	99·0	22 225	2 844
Improved Intermediate	Ewing	White, intermediate	93·7	21 425	2 509
Danish Champion White	Exp. Farm, Ottawa.	Yellow, intermediate	98·4	20 1,850	2 493
Long Orange Belgian	Bruce	Orange, long	91·6	16 1,700	2 96
Yellow Belgian	Ewing	Yellow, intermediate	92·7	16 1,150	2 95
Long Orange	Bruce	Orange, intermediate	94·1	15 150	2 77
New Yellow Intermediate.	Ewing	Yellow intermediate	87·3	17 1,325	1 1,994
White Belgian	Ewing	White, long	93·3	17 350	1 1,912
Large White Vosges	Bruce	White, intermediate	95·0	18 522	1 1,899
White Belgian	Dupuy and Ferguson.	White, long	97·2	17 1,275	1 1,756

FACTORY SUGAR BEETS

Variety tests of factory sugar beets have been conducted at this Station for several years. The results obtained indicate that beets of excellent quality for sugar making and fair crop yields may be expected.

For the season of 1924, the test included a number of lots of seed supplied by the Dominion Sugar Company, Chatham, Ont., obtained from various sources. Following are the results obtained:—

FACTORY SUGAR BEETS—TEST OF VARIETIES, 1924

Variety or source of seed	Yield per acre	Sugar in juice	Co-efficient of purity
	tons lb.	p.c.	p.c.
Schreiber & Sons	20 1,200	16·97	87·62
Kitchener, Ontario	18 1,700	17·26	87·24
Horning	18 -	17·85	91·35
Dippe	15 1,700	16·93	87·70
Dr. Burgman	15 700	18·21	91·24
Vilmorin's Improved B	13 1,100	16·89	87·18
Henning & Harving	12 900	18·52	88·20

FALL TURNIPS

In connection with the classification of field roots being conducted by the Division of Forage Plants, Central Experimental Farm, Ottawa, twenty-four varieties of fall turnips were grown at this Station in quadruplicate plots. Of these, the highest yielding sorts obtainable commercially in Canada were, Pomeranian White Globe, obtained from Steele-Briggs, and White Globe supplied by Ewing.

ALFALFA

Alfalfa is apparently quite hardy and productive at Lennoxville, when given a good start on well-drained land free from acidity and in a high state of fertility. During the past nine years all attempts to establish a stand with a nurse crop of grain, or in combination with timothy and clovers have failed. On the other hand, when sown alone without a nurse crop, under ideal soil conditions, it has proven quite hardy and produced large yields.

In 1923 the test of alfalfa included two regional, variegated varieties. The land used was a very heavy clay, naturally well drained and in good fertility. Two and one-half tons of ground limestone were applied to the acre early in the spring and, further to insure a stand, the seed was inoculated with nitro-culture. The varieties were sown in duplicate one-sixtieth acre plots on June 8. A perfect stand was obtained and the crop made fair growth during the season, entering the winter with a thick stand about ten inches high. All plots wintered perfectly and were cut twice during 1924. Following are the yields obtained:—

ALFALFA—TEST OF VARIETIES

Variety	Dates cut	Average yield per acre					
		1st cutting		2nd cutting		Total	
		Green	Air-dry	Green	Air-dry	Green	Air-dry
		tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
Northern Grown	July 6 and Sept. 9.	8 290	2 1,191	7 1,720	1 1,372	16 10	4 562
Brampton Ont	July 6 and Sept. 9.	11 1,337	3 456	10 790	2 1,310	22 127	5 1,766

The dry weights indicated in the foregoing table represent a reduction to a constant air-dry weight which is considerably lighter than ordinary hay. By actual trial it was found that well-cured alfalfa hay would shrink at least ten per cent. Accordingly, the yield of 5 tons 1,766 pounds of air-dry material obtained from the Brampton strain would represent a yield of 6 tons 1,060 pounds of hay. Such a yield is extremely high when compared with timothy or mixed hay, and although alfalfa cannot be easily grown in this district, a successful stand of this crop would justify a fairly heavy expenditure and considerable trouble.

SWEET CLOVER

Although considered a very valuable crop in many parts of Canada, sweet clover has shown few, if any, superior qualities when grown at this Station. During the past three years all attempts to establish a stand along with a nurse crop have failed, but when seeded alone on very fertile land it will winter fairly well and produce a light to average crop of coarse hay. It has also been found difficult satisfactorily to cure the hay as it dries slowly and will frequently have to remain out during several rains. A two-year average of results with the white and yellow varieties, grown under ideal conditions, is shown in the following table:—

SWEET CLOVER—AVERAGE OF RESULTS, 1923 AND 1924

Variety	Per cent hardy	Height	Yield per acre	
			Green	Air-dry
		inches	tons lb.	tons lb.
Yellow	58·5	37	7 1,660	2 451
White	74·5	49	7 1,810	2 376

HUBAM

This plant, which is an annual clover of fairly recent introduction, is being used successfully in many parts of Canada. It has been tested at Lennoxville for the past three years but the results obtained have not been encouraging. In 1922, flooding destroyed the stand, when about three inches high, but in 1923 a yield of 2 tons, 1,280 pounds, of air-dry material was obtained. The hay from this crop was of good quality and seemed easier to cure than white sweet clover. In 1924, although the seed germinated well, the crop made but little progress and was practically a failure. The experiment is being continued, but, at present, it would seem that the crop cannot be recommended.

RED CLOVER

Although liberal quantities of red clover seed are annually included in the mixtures for hay commonly used throughout the district, good stands of this crop are becoming very rare. In general, this partial failure is apparently due to lack of hardiness, and, in some instances, to soil acidity. It has, however, been observed during the past two seasons that, even on acid soil, at this Station, hardy strains of red clover have given fair yields, and tender sorts have not wintered on land where the acidity has been corrected. Accordingly, it would seem that better results are bound to accompany the use of hardier strains. Following is the two-year average of results of nine regional strains and varieties:—

RED CLOVER—TEST OF VARIETIES AND STRAINS—AVERAGE OF RESULTS 1923 AND 1924

Variety or strain	Number of cuttings		Average per cent hardy	Total			
				Green		Air-dry	
	1923	1924		tons	lb.	tons	lb.
Medium Late Swedish	1	1	86·2	11	1,580	3	388
Seed grown in Ottawa district	2	2	85·7	10	15	2	1,348
Seed grown at St. Clet, Que	1	2	84·7	9	720	2	1,174
Seed from Italy	1	1	77·5	8	100	2	797
Seed grown at St. Casimir, Que	2	2	84·2	9	255	2	314
Alta Swede	1	1	82·2	7	1,535	2	145
Late Red Swedish	1	1	54·5	5	685	1	1,029
Early Red Swedish	1	1	71·5	5	640	1	1,013
Seed grown in Kenora district, Ont	1	1	63·5	5	680	1	995

ALSIKE AS A SUBSTITUTE FOR RED CLOVER

Owing to its supposed indifference to soil acidity, alsike clover is often considered as more suitable for most of the soils throughout the Eastern Townships than red clover. A project to determine the value of alsike as a substitute for red clover on average Eastern Townships soil was begun in 1922 and a further seeding was made in 1923. Following are the average results from the two years' work:—

COMPARISON OF ALSIKE AND RED CLOVER—AVERAGE RESULTS 1923 AND 1924 SEEDINGS

Quantity of seed per acre		Percentage composition of hay		Average yield per acre			
				Green		Air-dry	
lb.	lb.			tons	lb.	tons	lb.
Timothy 8	Red clover 10	Timothy 33	Red clover 51 Foreign 16	12	840	3	1,314
Timothy 8	Red clover 8 Alsike 2	Timothy 36 Alsike 14	Red clover 36 Foreign 14	11	1,205	3	494
Timothy 8	Red clover 6 Alsike 3	Timothy 32 Alsike 20	Red clover 31 Foreign 16	11	200	2	1,842
Timothy 8	Red clover 4 Alsike 4	Timothy 33 Alsike 29	Red clover 22 Foreign 16	11	770	3	422

Although the soil on which the experiment was conducted was distinctly acid, alsike did not prove superior to red clover in the mixture. Contrary to expectations, red clover made a very strong growth and in each of the mixtures formed a fair portion of the crop. Alsike and timothy also grew well, with the result that the yields of the plots varied but little. Accordingly, the results from the two years' work indicate that under average conditions, where the soil is well drained and only moderately acid, alsike will not give higher yields than red clover. This experiment is being continued.

GRASSES WITH MIXED CLOVER AS A BASE

Although timothy is the most commonly used agricultural grass, fair yields of hay are possible with other grasses less commonly used. A project to determine the value of some of these comparatively rare grasses was begun in 1921, and has been conducted each year since. With each grass a standard mixture composed of five pounds timothy, eight pounds red clover, two pounds alsike

and one pound White Dutch clover per acre was used as a base and the required amount of the various grasses added to it. Following are the average yields for the past two years:—

COMPARISON OF AGRICULTURAL GRASSES—AVERAGE OF RESULTS, 1923 AND 1924

Amount of grass seed substituted for 5 pounds of Timothy in standard mixture	Yield of cured hay per acre	
	tons	lb.
Red top, 4 pounds	3	1,641
Timothy, 5 pounds	3	1,472
Tall oat, 8 pounds	3	1,105
Meadow fescue, 10 pounds	3	1,000
Orchard grass, 10 pounds	3	775

From the foregoing table it will be noted that the substitution of four pounds of red top for five of timothy, in the mixture, produced an increase in yield of one hundred and sixty-nine pounds per acre. Such an increase is inconsiderable and would little more than pay for the extra cost of seed. Under average conditions, timothy is, without doubt, the most satisfactory grass at present available.

TIMOTHY

Nine regional strains and varieties of timothy were sown in duplicate sixtieth-acre plots in 1922. The land was a fairly light loam underlaid with gravel but in a fair state of fertility. Germination was uniform and a good stand was obtained on all plots. Following are the yields for 1923 and 1924, and the total yield for both seasons, of each variety or strain:—

TIMOTHY—TEST OF VARIETIES 1922, SEEDING

Variety	Height	Yield per acre 1923				Yield per acre 1924				Total yield per acre 1923 and 1924			
		Green		Dry		Green		Dry		Green		Dry	
	in.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Boon	45	9	510	4	593	7	1,470	3	564	16	1,980	8	1,157
Ohio No. 9327	44	8	250	3	782	5	1,850	2	874	14	110	5	1,656
Grand Prairie	38	7	1,660	3	313	5	1,220	2	1,010	13	880	5	1,329
Ohio (commercial)	42	7	1,210	2	1,900	5	1,730	2	974	13	940	5	874
Ohio No. 3937	39	8	260	3	683	4	1,510	1	1,834	12	1,770	5	518
Ohio No. 6779	42	6	1,890	2	1,913	4	820	2	2	11	710	4	1,915
Ohio No. 9353	38	5	1,910	2	478	4	1,240	2	146	10	1,150	4	624
Ohio No. 9349	39	6	660	2	1,091	3	750	1	1,222	9	1,410	4	313
Lennoxville (commercial)	40	5	890	2	228	3	330	1	1,804	8	1,220	4	32

The results of one seeding, although embracing two seasons' yields, are not to be considered as conclusive. However, in so far as the Boon selection is concerned, it is apparent that it possesses very superior qualities. It represents seed harvested in bulk from plants of superior type growing in the breeding area at the Central Experimental Farm, Ottawa. Its performance, in competition with other varieties and strains, would seem to justify the prediction that varieties developed from this source should prove of exceptional value for western Quebec.

TEFF GRASS

This annual grass was tested in duplicate sixtieth-acre plots. Although the soil was in a high state of fertility and well drained, germination was slow

yet fairly complete. Throughout the season the crop grew slowly and was only eleven inches high when cut on September 16. The average yield of this grass for the past two years is 7 tons 130 pounds of green material per acre, representing 1 ton 1,715 pounds of air-dry weight. The quality of the hay was excellent but the yield in comparison with other forage crops grown on the same area was decidedly light. So far it has not proven a desirable forage crop at this Station.

SOY BEANS

Two one-hundredth acre plots were sown to soy beans in rows twenty-four inches apart, on May 29. The land used was in a good state of fertility, being part of the area prepared for field root experiments. The seed germinated well and the crop grew steadily until September 13, when it was killed by frost. The average yield of green forage was 8 tons 1,200 pounds per acre which, when reduced to a constant air-dry weight, equalled 2 tons 300 pounds of dry material.

POULTRY HUSBANDRY

The early, mild spring of 1924 made ideal weather conditions for hatching and the following fairly warm, dry May and June proved ideal for the rearing of young stock. Later summer conditions were not so good, as long continued periods of rain and wind storms were very general in this district. In September, as a result of three days' downpour of rain, and the breaking away of a dam higher up the St. Francis river, a serious flood occurred which completely overflowed the range where a large number of the young stock were housed, and caused the loss of a considerable number of much of the best young stock. This misfortune very seriously handicapped the work being conducted, and caused the holding over of some of the older birds as breeding stock that would otherwise have been disposed of.

IMPROVEMENTS

About two acres of meadow land just south of the original plant were added to the Poultry Division in order to provide a new range for the young growing stock. During the early spring, this piece of land was fenced around, and the four yards next to the main highway were ploughed and seeded to mixed grain and clover. Two new colony houses, each 8 by 10 feet, were built to be used for housing the growing stock on range. As no natural shelter was available on this new range, all the colony houses were raised about 15 to 18 inches from the ground thus providing a fairly satisfactory outside shelter from the sun and rain.

STOCK AND MATINGS

The stock on hand on this Farm at the beginning of 1924 consisted of 185 pullets, 110 breeding hens, one, two and three years old; 6 old males; and 12 young males. Only Barred Plymouth Rocks are kept. Of the 110 breeding hens, 90 have made records of over 200 eggs each in their pullet year. The breeding females were divided into separate pens about the middle of February and mated to males that were from known high-producing ancestors.

RESULTS OF DIFFERENT SPECIAL MATINGS

Colony A

Hen No.	Egg Record	Hen No.	Egg Record
E 48	290	F 1	230
G 18	286	G 142	223
G 190	284	F 80	219
G 103	264	D 120	217
F 116	258	C.D. 178	209
F 162	250	C.D. 161	207
G 151	234	C.D. 175	205
C.D. 169	234	F 143	203

These females were mated to a young male, a son of a 277-egg hen and 240-egg grand-dam. From this mating 527 eggs were set, of which 79·12 per cent were fertile and 69·54 per cent of the fertile eggs hatched.

Colony B

Hen No.	Egg Record	Hen No.	Egg Record
G 34	268	G 161	210
G 3	236	G 160	207
E 181	224	G 33	204
F 141	222	G 51	204
G 91	221	G 84	202
G 65	215	G 65	202
G 139	215	G 181	198
G 100	211	G 182	195

These females were mated to a young male, son of a 254-egg hen, and 282-egg grand-dam. From this mating 509 eggs were set, of which 89·78 per cent were fertile and 59·08 per cent of the fertile eggs hatched.

Colony C

Hen No.	Egg Record	Hen No.	Egg Record
E 8	264	E 1	222
E 22	252	E 165	214
E 25	245	E 10	212
E 40	242	E 39	208
E 78	238	E 38	207
E 150	228	D 13	207
E 20	226	E 55	206
E 15	225	E 23	204

These females were mated to a yearling male, son of a 290-egg hen, and 217-egg grand-dam. From this mating 345 eggs were set, of which 91·30 per cent were fertile and 45·39 per cent of the fertile eggs hatched.

Colony D

Hen No.	Egg Record	Hen No.	Egg Record
F 126	259	F 141	221
F 181	245	F 25	218
F 19	239	F 11	214
F 102	239	F 18	214
F 117	239	F 7	209
F 21	232	F 135	209
F 124	230	F 196	209
F 122	229	F 174	208

These females were mated to a yearling male, son of a 290-egg hen, and 217-egg grand-dam. From this mating 459 eggs were set, of which 78·86 per cent were fertile and 50·27 per cent of the fertile eggs hatched.

Pen 1

Hen No.	Egg Record	Hen No.	Egg Record
G 42	243	G 120	206
G 29	242	E 44	204
G 10	229	G 59	204
G 12	222	G 71	204
G 20	221	G 102	204
E 16	218	E 70	202
G 56	217	E 4	201
G 25	216	E 53	201
G 28	216	E 68	201
G 27	215	E 189	201
E 9	214	G 147	198
E 31	213	G 137	197
G 39	210	G 19	192
G 186	208	G 162	191
E 184	207	G 170	189

These females were mated to three young males, sons of a 264-egg hen, and the eggs used for hatching chicks to be sold as day-old chicks. From this mating 682 eggs were set, of which 86·80 per cent were fertile and 33·44 per cent of the fertile eggs hatched.

INCUBATION AND BROODING

The eggs were all hatched artificially in incubators, operated in the basement of the administration building. The incubators were started on March 15 and kept operating until June 2. Altogether, 2,118 chicks were hatched in the spring of 1924, 840 being kept for the Station, and the remainder sold as day-old chicks in lots of fifty or less. Pedigree baskets were used to separate the eggs of individual hens, and all chicks kept on the Station were pedigree-banded.

AVERAGE FERTILITY AND HATCHABILITY

Of the total eggs set during the spring of 1924, an average of 87.50 per cent were fertile, and 47.50 per cent of the fertile eggs hatched.

FERTILITY—HENS VS. PULLETS

The average fertility of all the eggs set from hens was 84.87 per cent, as compared with 92.91 per cent fertility of all eggs set from pullets.

HATCHABILITY—HENS VS. PULLETS

From hens an average of 53.72 per cent of the fertile eggs hatched and 45.59 per cent of the total eggs hatched, while from pullets 35.5 per cent of the fertile eggs hatched and 32.98 per cent of the total eggs hatched. Chicks were much stronger from hens than from pullets.

RESULTS FROM REGISTERED HENS

From three registered hens, mated to a cockerel, the son of a 277-egg dam and a 240-egg grand-dam, 88 eggs were set, 98.86 per cent were fertile and 73.86 per cent of the fertile eggs hatched.

BROODING

The chicks which were kept on the Station were all artificially brooded, colony houses being used for the purpose, equipped with coal-burning brooder stoves. The houses used for brooding were placed on land where poultry had

not been allowed to roam for a number of years, in order rightly to note the value of new range for growing stock. The brooding results were very satisfactory; 94.25 per cent of the total chicks put into the brooders were alive when wing banded at five weeks old.

METHOD OF FEEDING THE YOUNG STOCK

The chicks were allowed no food until about 50 to 60 hours after hatching. They were then given small feeds, every three hours, of dried bread which had been put through a grinder, and very slightly moistened with water or milk. After the second or third day of feeding, the bread is gradually substituted by a mash composed of bran, middlings, cornmeal and a small percentage of fine beef meal or bone meal, while some good prepared chick feed of finely cracked grains is also used as alternate feed after this stage. The chick feed is scattered in a litter of cut straw or clover chaff to encourage exercise. Fresh water is kept in fountains before them, and sour milk is gradually introduced after the fourth day, being fed in wooden or earthen vessels. A small percentage of hard-boiled infertile eggs may be used after the third or fourth day also. Great care must be taken in providing proper temperature and food during the first two weeks. Musty or mouldy food or litter must not be used if the best results are to be expected. After five or six weeks of age, the chicks are gradually accustomed to some coarser grains, and self-feeding hoppers are used, supplied with a home-mixed ration of equal parts wheat and cracked corn, in one compartment of the hoppers, and a dry mash of bran, middlings, corn meal and ground beef meal in another compartment. If more rapid growth was desired, a mash made of the same meal mixture as fed in the hoppers, was moistened with sour milk and fed at noon in troughs where all birds could have an equal chance to feed.

TEST OF STARTING FEED FOR CHICKS

A commercial starting feed for chicks, in which is used a percentage of cod liver oil, was tried out on two lots of chicks. This feed, according to accompanying directions, was supposed to be fed dry in open troughs or feeders as an exclusive starting feed for the first two weeks of a chick's life. The two lots of chicks on test were fed according to directions with very satisfactory results. A noticeable feature was the very small percentage of mortality, and the general healthy appearance of the chicks.

FEEDING LAYING PULLETS

An average of 157 pullets were housed in the laying pens from November 1, 1923, to October 31, 1924. These birds produced during that time 27,421 eggs or 2,285.5 dozens which, at the average market of 45.5 cents per dozen, amounted in value to $975.21. The average percentage production per day throughout the year was over 48.5. During the year, 52 of those birds made records of over 200 eggs each. The eighteen best records made were as follows: 275, 270, 263, 259, 254, 253, 252, 251, 251, 249, 249, 248, 246, 244, 242, 242, 241, 241. The most interesting feature is that the eighteen pullets which made the above records are from hens which have made records of over 200 eggs in their first year, and that eleven of the pullets were sired by sons of a 301-egg hen, while the other seven were sired by sons of a 290-egg hen.

The pullets are fed on a home-mixed scratch grain consisting of one part cracked corn, one part wheat and one-half part good plump oats. The scratch grain is scattered in a deep litter of straw during the morning and again in the afternoon, a heavier feed being given in the afternoon than in the morning. A dry mash consisting of 100 pounds bran, 100 pounds middlings, 100 pounds corn meal and twelve to fifteen pounds of ground beef meal, to every 100 pounds of the meal mixture is fed in an open opper. A small quantity of the same mixture

is moistened with warm water, or sour milk, if available, and fed at noon every second day. Grit, oyster shell and water are available at all times. During the fall and winter months, a small quantity of freshly cut, green beef bone is fed occasionally. Green feed is supplied either by mangels, sugar beets or clover leaves.

COST OF FEEDING LAYING PULLETS

An account is kept of all feed consumed by the pullets each month of the year, and charged at the price which is being paid for it in the locality. The total cost of feed consumed by the pullets, from November 1, 1923, to October 31, 1924, amounted to $339.08, or an average of $2.13 per pullet. The average number of pullets in the pens during each month was the dividing factor for the average cost per bird.

FEEDING THE BREEDING HENS

Owing to older birds taking on fat more readily, a lighter grain ration is used consisting of one-half part cracked corn, one part wheat and one part good heavy oats. The dry mash is also of a lighter nature, consisting of two parts of bran, one part middlings, one part corn meal and a small percentage of beef meal. Great care must be taken to see that the birds get exercise by scratching for their grain in a heavy litter.

COST OF FEEDING BREEDING HENS

An account is kept of the feed required to feed the breeding hens in order to know whether any profit over cost could be realized from them. The total cost of feed consumed by the hens from November 1, 1923, to October 31, 1924, amounted to $167.55 or an average of $1.79 per hen. The average number of hens in the pens during each month was the dividing factor for average cost per bird.

EGG PRODUCTION—PULLETS VS. HENS

As a comparison in egg production, pullets were compared against hens during the twelve months, November 1, 1923, to October 31, 1924. The average production from pullets during the year was 177.5 eggs per bird, while the average from hens was 118.25 eggs per bird. Thus the average production from pullets was almost 60 eggs per bird better than the average from the hens during the same time.

COST OF PRODUCING EGGS IN WINTER MONTHS

The average cost of feed to produce one dozen eggs from pullets during the four winter months, November 1, 1923, to February 29, 1924, was 36.5 cents per dozen, while the average cost for feed to produce one dozen eggs from hens during the same time was 91.75 cents per dozen. The average production per day during the winter months was 35 per cent from the pullets, as compared with 6.25 per cent production from the hens.

COST OF PRODUCING EGGS DURING TWELVE MONTHS

The average cost of feed to produce one dozen eggs from pullets during twelve months, November 1, 1923, to October 31, 1924, was 20.5 cents per dozen, while the average cost for feed to produce one dozen eggs from hens during the same time was 39.75 cents per dozen. The average production per day during the twelve months was 48.5 per cent from the pullets, as compared with 32.25 per cent from the hens.

EGGS REQUIRED TO PAY FOR FEED

During the four winter months, November 1, 1923, to February 29, 1924, the cost of feed was 71.75 cents per pullet. The prevailing market price of eggs during that time averaged 62 cents per dozen, thus requiring each pullet to lay at least 14 eggs during the four winter months in order to pay cost of her feed.

During the twelve months, November 1, 1923, to October 31, 1924, the cost of feed was $2.13. The prevailing market price of eggs during that time averaged 45.5 cents per dozen, thus requiring each pullet to lay at least 57 eggs during the year in order to pay cost of her feed.

SUMMARY OF FIVE YEAR'S TESTS WITH PULLETS AND HENS

The results of a series of tests conducted over a period of five years have been summarized and should be of general interest to the public.

Pullets

Average number of pullets used in tests each year	No.	155
Average cost of feed consumed per bird each year	$	2·33
Average number of eggs produced per bird each year	No.	162
Average price of eggs per dozen	cts.	52·5
Average cost of feed required to produce 1 dozen eggs	"	21·25
Average per cent production per day each year	%	44·25
Average profit over cost of feed per bird each year	$	4·58

Hens

Average number of hens used in tests each year	No.	69
Average cost of feed consumed per hen each year	$	1·98
Average number of eggs produced per hen each year	No.	117·5
Average price of eggs produced per dozen each year	cts.	0·48
Average cost of feed required to produce 1 dozen eggs	"	0·38
Average per cent production per day each year	%	32
Average profit over cost of feed per bird each year	$	2·00

SALE OF BREEDING STOCK

Owing to the loss experienced during the flood in September, there were not as many cockerels as usual for sale as breeding stock. However, over fifty cockerels were sold, during October and November, to farmers of the Eastern Townships. Much keener interest is being taken by the farmers in attempting to secure males from a high producing strain, and it is encouraging to have farmers, who were somewhat indifferent as to the value of a good strain in the past, coming back inquiring for a male bird from a good strain, as they had noticed an improvement in the progeny from the previous purchase.

QUEBEC WESTERN EGG LAYING CONTEST

The second egg laying contest to be conducted at the Lennoxville Station was commenced on November 1, 1923, and was completed on October 29, 1924. The total number of eggs produced during the fifty-two weeks of the contest was 29,764, as compared with 29,143 produced during the fifty-two weeks of the first contest. Nineteen birds had the necessary qualifications for registration and these were tattoed according to the rules of the Canadian National Poultry Record Association. The names of the owners of the birds that qualified are given in the following table:

OWNERS OF REGISTERED BIRDS

Owner	Address	Number of birds	Breed
Laurel Poultry Farm	Rougemont, Que.	4	White Leghorns
Jos. Williams	Sawyerville, Que.	1	" "
H. S. Beane	Beebe, Que.	1	" "
Dr. J. Watson	Howick, Que.	1	" "
E. G. White	Lennoxville, Que., R.R. 1	2	White Wyandottes.
Bond Little	North Hatley, Que., R.R. 1	1	" "
Fred Bell	Ayer's Cliff, Que.	1	" "
Experimental Farm	Lennoxville, Que.	4	Barred Rocks.
A. P. Hillhouse	Foster, Que.	1	" "
H. R. Drew	North Hatley, Que., R.R. 3	3	" "

TEN HIGHEST PENS DURING THE SECOND CONTEST

Number of pen	Breed	Owner	Address	Total number of eggs laid
1	W. L.	Laurel Poultry Farm	Rougemont, Que.	1,927
16	B. R.	Experimental Farm	Lennoxville, Que.	1,919
8	W. W.	Bond Little	North Hatley, Que, R.R. 1	1,795
15	B. R.	Experimental Farm	Lennoxville, Que.	1,712
20	B. R.	H. R. Drew	North Hatley, Que, R.R. 3	1,675
2	W. L.	Jos. Williams	Sawyerville, Que.	1,668
10	W. W.	Miss R. G. Knight	Beebe, Que.	1,656
3	W. L.	H. S. Beane	Beebe, Que.	1,652
7	W. W.	H. S. Beane	Beebe, Que.	1,625
17	B. R.	A. P. Hillhouse	Foster, Que.	1,559

TEN HIGHEST INDIVIDUALS DURING THE SECOND CONTEST

Number of bird	Breed	Owner	Address	Number of eggs
13	W. L.	Laurel Poultry Farm	Rougemont, Que.	253
17	W. L.	Laurel Poultry Farm	Rougemont, Que.	237 tie.
167	B. R.	Experimental Farm	Lennoxville, Que.	237
82	W. W.	Bond Little	North Hatley, Que, R.R. 1	233
171	B. R.	A. P. Hillhouse	Foster, Que.	230
152	B. R.	Experimental Farm	Lennoxville, Que.	226 tie.
11	W. L.	Laurel Poultry Farm	Rougemont, Que.	226
161	B. R.	Experimental Farm	Lennoxville, Que.	225 tie.
209	B. R.	H. R. Drew	North Hatley, Que., R.R. 3	225
53	W. L.	Dr. J. Watson	Howick, Que.	221

FEEDING OF CONTEST BIRDS

A mixed grain ration consisting of 100 pounds wheat, 100 pounds cracked corn and 50 pounds plump oats, was used as a scratch feed scattered in a litter of straw. A dry mash ration consisting of 100 pounds bran, 100 pounds middlings, 100 pounds corn meal, with 12 to 15 per cent of beef meal and 1 per cent of charcoal, was kept in self-feeding hoppers at all times. Grit and oyster shell are also kept in hoppers before the birds. Small quantities of ground green bone are fed occasionally. The green feed during the summer months consisted of green clover, and mangels or sugar beets during the winter months. Fresh water is provided at all times and skim-milk if it is available.

QUANTITY OF FEEDS USED PER BIRD

The birds in the contest consumed, during the 52 weeks, 7,330 pounds of grain feed, 7,977 pounds of mash, 1,118 pounds of beef scrap and green bone supplied extra over the quantity in the mash, 275 pounds of grit, 760 pounds oyster shells and 6,916 pounds of green feed. The average per bird was 38.58 pounds grain, 41.98 pounds meal mixture, 5.88 pounds beef scrap, 1.44 pounds grit, 4 pounds oyster shell and 36.4 pounds of green feed.

COMPARISON OF HIGHEST VS. LOWEST PENS

The ten birds which made the highest production during 52 weeks in the contest cost for feed $21.01, or an average per bird of $2.10. Deducting this cost of feed from the value of the eggs produced, would leave a profit of $45.31, or an average per bird of $4.53. The ten birds which made the lowest production during the fifty-two weeks, cost for feed $22.35, or an average per bird of $2.23. Deducting this cost of feed from the value of the eggs produced, would leave a profit of $3.60, or an average of 36 cents per bird.

AVERAGE COST OF FEED PER BIRD

The average cost for feed during fifty-two weeks was $2.19 per bird and the average profit over cost of feed was $2.85 per bird.

The third egg-laying contest commenced on November 1, 1924, and contains nine pens of White Leghorns, six pens of White Wyandottes, four pens of Barred Rocks and one pen of Silver Wyandottes. About fifty of the birds entered are second generation birds, and many of these are doing remarkably well. The general condition of the birds in the third contest is splendid and the results up to time of writing are greatly in advance of the two previous contests at the same time.

BEES

The season of 1924 was favourable on the whole for bees and good progress was made with the apiary. Of the twelve colonies put into winter quarters in the fall of 1923, ten survived. When the hives were opened on April 21, of the surviving colonies, seven were found to be in a fairly vigorous condition while the remaining three were rather weak. No gains were made before the dandelion flow which began the latter part of May. From that time onward, steady gains were made until the middle of July when rainy weather checked the activity of the bees. The greatest gains were made during the latter part of June and the first of July while the main clover flow was on. The highest production for one day from the hive on scales during this period was 15.25 pounds on July 12. Honey production was retarded in August owing to the fact that several divisions were made and new colonies formed. During September the weather was wet and unfavourable. Feeding was begun on September 22 and continued until October 25. Four colonies were put in the quadruple wintering case on October 4 and fourteen in the cellar on November 25.

WINTERING

During the winter of 1923-24, eight colonies were placed in the cellar of the office building and four outside in a quadruple wintering case. Two colonies out of the twelve succumbed, one in the cellar and one outside. Of those remaining, the colonies wintered in the cellar were much the stronger, the average number of frames covered with brood being 5.7 as compared with

three frames for those in the wintering case. The scarcity of bees in both cases was probably due to the fact that the queens stopped laying early in the fall, leaving only the old bees to be wintered over. The colonies wintered in the cellar were taken out on April 17 and examined on April 21. Of the ten remaining hives, one was queenless, while six had brood in all stages.

INCREASE

The main object of the work with bees up to the present time, has been to increase the number of colonies until there is a number sufficient for experimental work. Honey production is, therefore, a secondary consideration. During the season the number of colonies was increased from ten to eighteen. All the queens required for increase as well as for requeening were raised at Lennoxville. Swarming was controlled by cutting out the queen cells every ten days. Division began on June 26 and continued at intervals until July 12, by which time the number of colonies had increased to eighteen.

HONEY FLOW

In order to obtain information regarding the honey flow and production, one colony of average strength was kept on the scales from May 1 to October 1. During this time, the honey produced by this colony amounted to 136.5 pounds. From the time the hive was opened until the dandelion flow there was a loss of 1.25 pounds. After June 1, there was a gradual increase which totalled 36 pounds for that month. The highest gains were recorded during the first twelve days of July, after which production gradually fell off owing to wet weather. Although gains were recorded during the golden-rod flow in the latter part of August, they were not sufficient to offset the losses during the early part of the month. Early in September bad weather again checked the gains and production gradually declined from that time on. The following table shows the main sources of nectar and the length of time such sources were available.

KIND AND LENGTH OF NECTAR SECRETIONS DURING 1924

Source	Date flow started	Date flow ended	Length of flow
			days
Willow	April 27	May 14	18
Dandelion	May 28	June 11	15
Fruit bloom	May 25	June 17	24
Clovers	June 26	Aug. 1	37
Raspberry	June 24	July 1	8
Basswood	Aug. 1	Aug. 5	5
Golden rod	Aug. 23	Sept. 3	12

FEEDING

In order to maintain the vigour of the colonies during the long winter season, it is always necessary to provide an abundance of stores. Owing to the fact that the bees raised considerable brood in the fall, which used up stores, they required more than the usual amount of feeding. This was done by feeding three frames of clover honey per hive and supplementing with a syrup made up of sugar two parts and water one part. Common five-and ten-pound honey pails were used as feeders with sixty or seventy small nail holes punched in the covers. The pails were filled and inserted on top of the frames of each colony. On November 25, fourteen colonies were put away in a cellar especially fixed for the purpose, and four were put in the quadruple wintering case with dry planer shavings as an insulator. Each of the colonies to be wintered in the cellar was fed to weigh up to 70 pounds without the cover while those in the wintering case were fed to weigh 80 pounds.

FIBRE PLANTS

HEMP

Although not grown in the Eastern Townships, hemp is an important crop in portions of Canada and in other countries. Experiments with this crop were begun at Lennoxville in 1923, when two plots of the variety known as Minnesota No. 8 were grown. The plants attained a height of seven feet six inches, and a yield of 900 pounds per acre of fairly good fibre was obtained.

In 1924 the work with this crop was extended to include three projects with a total of twelve plots. The land used for the experiments was a light loam underlaid with gravel. This was ploughed out of sod and manured at the rate of twenty tons of barnyard manure per acre the previous autumn. Early in the spring, it was well worked with the disk and drag harrows.

Crop of hemp at Lennoxville in 1924.

With the exception of the dates of seeding experiment, all plots were sown on May 20, and the entire crop was harvested on September 17 and 18. Following are the results of the experiments:—

HEMP, VARIETY TEST, 1924

Variety	Height	Stage when cut	Yield per acre		Quality of Fibre
			Fibre	Tow	
	ft. in.		lb.	lb.	
Chington	10 0	Full bloom	1,500	390	medium
Minnesota No. 8	11 9	"	840	600	coarse

HEMP, DATES OF SEEDING WITH MINNESOTA No. 8

Date Seeded	Height	Stage when cut	Yield per acre		Quality of Fibre
			Fibre	Tow	
	ft. in.		lb.	lb.	
April 28	12 3	Past full bloom	960	720	coarse
May 5	11 8	Full bloom	870	540	coarse
May 20	11 10	Nearly full bloom	1,290	600	medium
June 3	10 6	Beginning to bloom	1,380	540	fine

While the yields obtained are exceptionally high, it must be borne in mind that they represent but a single season's work and hence cannot be taken as more than a mere indication of the results that may be expected with hemp in this district. One point, however, is clearly evident, that is, to secure a good crop of fibre a full and complete stand of plants is necessary.

With early seedings in 1924 it proved difficult to secure a good germination and although later seedings produced a shorter plant, the stand was thicker and the resulting yields of fibre much higher.

DRILLING VS. SOWING BROADCAST

In the comparison of seding in drills, six inches apart, and broadcast, it was found that in the earlier seedings better germination was obtained with the drill method.

FLAX

Two projects with fibre flax were attempted in 1924, but unfortunately the land available for this work proved unsuitable and little or no information was obtained from the season's work.

GENERAL NOTES

SHORT COURSE.—The Experimental Station, in co-operation with the Provincial Department, Canadian Co-operative Wool Growers Limited, Sherbrooke Agricultural Society, Lennoxville Farmer's Club, Sherbrooke Sheep Breeders Association and Womens' Institute, put on in January, a three days' short course, at Lennoxville. This course was attended by fifty boys and eighteen girls.

MEETINGS AND EXCURSIONS.—The tenth annual Farmers' Field Day was held this year on August 13, the usual large number of people being present.

A meeting was held on October 31 of provincial and federal officials engaged in agricultural activities for the benefit of agriculture in the Eastern Townships, to study ways and means whereby a closer co-ordination could be worked out in the work of both departments.

EXHIBITIONS.—The permanent central exhibition booth in the main building at the Sherbrooke Exhibition was utilized by the Station. This fair was held from August 23 to August 30. The Experimental Station exhibit also was taken to the Brome County Fair and to Cookshire and Scotstown. The poultry exhibit was staged at the Sherbrooke Poultry Show in January, also at Quebec, Montreal and St. Hyacinthe.

The staff acted as judges in certain divisions at practically all the fairs in the district, as well as at different heifer and calf club shows, standing crop competitions and school fairs.